Engin Karadağ *Editor*

The Factors Effecting Student Achievement

Meta-Analysis of Empirical Studies

Springer

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Chapter 1
Introduction to Meta-analysis

Nazım Çoğaltay and Engin Karadağ

1.1 Introduction

The question of how to bring together and interpret research studies that are independent from one another is a basic and important question in all sciences. Hence, the inability to conduct research studies with large samples to represent a wider population because of obstacles such as time, cost and expert researchers and the discussion of how effective the findings of a single study can be have necessitated the synthesis of the results of a multitude of studies. The inadequacy of the results of a single study and the need to synthesize findings by scientists have led to the development of methodologies that allow for combining the results of many independent studies.

Many methods have been used to synthesize the findings of multiple studies. The first attempts at synthesizing studies can be observed in the efforts made to merge findings in the fields of astronomy and physics. Subsequently, experts in the field of agriculture began to develop statistical techniques that would allow for the compilation of repeated measurements (Hedges and Olkin 1985). The compilation of data from multiple studies was conducted by means of narrative compilations. An expert in the field would read a study on a particular topic, summarize the findings and provide a conclusion regarding the summary of findings. However, this method

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was deemed ineffective because of limitations such as the varying subjectivity of different researchers (criteria, reliability, and validity) and the fact that only studies with a consistent effect size could be compared. These limitations of the narrative compilation method motivated scientists to seek a different methodology, and as a result, the methods of systematic review and meta-analysis emerged (Borenstein et al. 2009).

Systematic review and meta-analysis are two approaches aimed at synthesizing different studies that are independent of one another but also compatible. When both methods are used together, it is possible to compile the quantitative evidence, analysis and scientific approaches as a whole. This approach makes it possible to obtain a large sample size and to provide new perspectives on developing social policies. However, these two approaches are not synonymous; they represent two different approaches. Many meta-analysis studies are not systematic reviews. Meta-analysis studies can be a part of a systematic review, but this is not true of all meta-analyses (Littell et al. 2008).

It is believed that the first meta-analysis study was conducted by Karl Pearson in 1904 when he attempted to synthesize the independent vaccine studies concerning typhoid (Littell et al. 2008). However, it was not until the 1970s that social and behavioral scientists began using meta-analysis. Glass (1976) coined several statistical terms for synthesizing the results of more than one study. Studies from that period aimed to synthesize the results of independent studies on topics such as the effects of psychotherapy (Smith and Glass 1977), the effects of classroom populations on achievement (Glass and Smith 1978), the effect of interpersonal expectations (Rosenthal and Rubin 1979) and the validity of race-based employment tests (Hunter et al. 1979). After the 1980s, scientists began to develop statistical methods or meta-analysis (Light and Pillemer 1984; Hedges and Olkin 1985; Cooper and Hedges 1994; Cooper 1998), and thus, meta-analysis became a statistical technique.

As a means to synthesize the results of multiple studies, the chronological development of the meta-analysis method was in parallel to a variety of definitions in the literature. Glass (1976), who first proposed the concept of meta-analysis, discussed primary analysis, secondary analysis and meta-analysis concepts and emphasized that these types of analyses were not to be confused with one another. He defined primary analysis as the analysis conducted in an original study, defined secondary analysis as the use of statistics to better understand the problem discussed in the original research or the use of data to find answers to new problems, and defined meta-analysis as the analysis of analyses. Meta-analysis can be defined in different ways: as a means of summarizing and combining the quantitative results of research (Glass et al. 1981) or as a method used to reach the quantitative effect size based on individual studies (Durlak 1995). The meta-analysis method differs from other quantitative review methods that attempt to test the correctness of hypotheses (Littell et al. 2008). Meta-analysis is the method of conducting a statistical analysis of the research findings of many independent studies conducted on a certain topic (Borenstein et al. 2009; Cohen et al. 2007; Glass 1976; Hedges and Olkin 1985; Littel et al. 2008; Petitti 2000).

Meta-analysis uses many quantitative approaches and calculation formulas when compiling multiple research findings. In this sense, no researcher needs to be an expert in all types and calculation formulas for all types of meta-analysis. However, if the researcher lacks familiarity with at least some of the main concepts of meta-analysis, then the correct results may not be obtained. This chapter aims to explain some of the main concepts of meta-analysis.

1.2 Effect Size and Types

The main objective of the meta-analysis method is to determine a summary effect size by synthesizing data from multiple research studies. The effect size in meta-analysis is a measure of the strength and direction of the relationship between variables (Littell et al. 2008). This term may be expressed in different ways for various fields. In the field of medicine, the effect size is expressed as the application effect and is sometimes expressed as the odds ratio, the risk ratio or the risk difference. In social sciences, the term 'effect size' is used frequently but is sometimes expressed as the standardized mean difference or relationships (Borenstein et al. 2009).

The most frequently used effect size calculations fall into these categories: (*i*) proportions, (*ii*) averages and (*iii*) correlation coefficients. There is more than one way to calculate effect size in these categories. The preferred calculation of effect size will differ according to the aim and design of the study and the data format. Studies testing the effect of an intervention or studies aiming to make a variety of causal inferences (between pre- and post-test or between groups receiving and not receiving treatment) are in the category that use proportions and averages. Studies investigating the relationship between variables, besides causal direction inferences, are in the category of correlational meta-analysis (Littell et al. 2008). In other words, if the results of the effect size are numerical, then averages are used; if the results are nominal, then proportions are used; and if the results show a relationship, then correlations are preferred (Cohen et al. 2007). In addition, it is also possible to classify meta-analysis studies into one of two categories: (*i*) comparison of groups and (*ii*) correlational meta-analysis (Durlak 1995).

There are two important differences in the calculations of effect size: dichotomous data and continuous data. Dichotomous variables are based on only two categories and frequently represent the presence or lack of a feature or situation. Pregnancy, high school graduation, and gender are examples of such variables. Continuous variables can have a range of values that can be expressed on a numeric scale. Examples of such variables include the number of pregnancies, the duration of training, and the duration of hospitalization. Test and scale results such as achievement tests or depression inventories can be considered continuous variables (Littell et al. 2008).

1.3 Effect Size in Dichotomous Data (Proportioning)

The effect size of dichotomous results is based on whether a phenomenon was observed. The most frequently used effect size measures are the *odds ratio (OR),* the *risk ratio (RR)* and the *risk difference (RD).* The odds ratio is the expression of the comparison of whether something has a probability of occurring (Littell et al. 2008). That is, the effect size is obtained from the proportion of two possibilities (Borenstein et al. 2009). The risk ratio, similar to the odds ratio, pertains to risk and is the ratio of risks to one another. The risk difference is the difference between two risks. The effect size of the odds ratio or the risk ratio is reached by converting data into logarithmic data, and the risk difference uses raw data to calculate the effect size. The odds ratio is the proportioning of the ratio of whether a certain phenomenon is observed in the experimental group to whether the phenomenon is observed in the control group. These effect size calculations are generally used in the fields of health and agriculture (*for more information, please see* Borenstein et al. 2009; Hedges and Olkin 1985; Kulinskaya et al. 2008; Petiti 2000). A hypothetical example showing calculations of the effect size of dichotomous data is shown in Table 1.1 (Littell et al. 2008).

1.4 Average Effect Size Between Groups for Continuous Data

The effect size obtained from continuous data can be divided into two main categories: (*i*) the non-standardized mean difference (D) and (*ii*) the standardized mean difference (d) or (g). Of these two types, raw data are used to calculate D means, and d or g is calculated using standardized techniques to convert raw data into other forms. These mean difference effect sizes are calculated using different techniques for each of the categories of data obtained from mean differences between groups independent of one another and from differences between the pre- and post-tests in the same group or matched groups (for further information concerning the techniques used, please see Borenstein et al. 2009; Hedges and Olkin 1985).

The non-standardized mean difference (D) is used when all of the research included in the study is reported using the same scale. In such cases, meta-analysis is conducted by calculating the raw differences of the direct means to determine the

Table 1.1 Effect size for dichotomous data in a hypothetical data table

	Event	No event	Total N	Odds	Risk
Experiment	4	6	10	4/6	4/10
Control	2	8	10	2/8	2/10

Odds ratio (OR) = (4/6)/(2/8) = 2.67
Risk ratio (RR) = (4/10)/(2/10) = 2.0
Risk difference (RD) = 0.40 − 0.20 = 0.20

effect size. However, the standardized mean difference (d) or (g) is used when results are reported based on different scales or methods in the studies included in the analysis. To compute the standardized mean difference, the resulting data are calculated by standardizing the standard deviation to equal 1 within the groups (Borenstein et al. 2009; Hedges and Olkin 1985; Kulinskaya et al. 2008; Littell et al. 2008).

1.5 Correlational Effect Size for Continuous Data

The relational values obtained from research reporting the relationship between two continuous variables are the calculated effect sizes. The effect size of studies is generally obtained by calculating the Pearson correlation coefficient, *r*. Studies that provide this coefficient or that provide the opportunity to calculate this coefficient are included in the analysis. As this correlation coefficient is a value between $+1$ and -1, calculations are performed by transforming the *r* value into its corresponding *z* table value. The correlation coefficient is itself considered the coefficient of effect size and is also symbolized by *r* (Borenstein et al. 2009; Hedges and Olkin 1985; Littell et al. 2008).

The effect width is considered when interpreting the effect size. This effect width is categorized in many different ways by various researchers; however, the most important categorization belongs to Cohen (1988), as shown in Table 1.2.

1.6 Choice of Model

There are two main models used in meta-analysis studies: the (*i*) fixed effect model and the (*ii*) random effect model. When deciding which model to use, the researcher must assess the characteristics of the research to determine which of the models' pre-conditions the study meets. In general, these two models use different processes to calculate the weights of studies, the average effect size and the confidence intervals for the average effects when calculating the effect size (ES). Therefore, to obtain the correct results in the processes of meta-analyses, it is important to choose the correct model in relation to the characteristics of the specific studies involved (Borenstein et al. 2009).

Table 1.2 Cohen's (1988) classification of effect width

Es metric	Small effect	Medium effect	Large effect
OR	1.5	2.5	4.3
SMD	0.2	0.5	0.8
r	0.1	0.25	0.4

OR odds ratio; *SMD* standardized mean difference; *r* correlation coefficient

The fixed effect model has the (*i*) same assumption as the function of the research and (*ii*) the aim of calculating only the effect size for the population. If it is determined that the function of the research is the same, that it shares a real effect and that the calculation of the real effect is not supposed to be generalized to wider populations, then the choice of model should be the fixed effect model. For example, a pharmaceutical company intended to conduct a drug trial study with 1,000 patients but has only been able to research one patient group at a time. Thus, the research was conducted more than once with repeated tests. In such cases, the model to be used to compile the repeated tests is the fixed effect model because the study was conducted by the same researchers and used the same doses and tests in patients from the same sample pool. Thus, all studies share the same real effect and meet all conditions for the fixed effect model, as the effect of the drug is investigated only in the identified population. It is important to note that it is uncommon to find meta-analysis studies of this type. It is nearly impossible to find research studies that meet the pre-conditions of the fixed effect model, especially in the social sciences and educational sciences.

In regard to the random effect model, it is assumed that the effect differs between sample groups and among studies. In summary, if the conditions of the fixed effect model are not met, then the random effect model should be used. The effects can differ in relation to the variables in the studies, such as the health, age, and education status of the sample subjects. For example, the effect size for a practice in the field of education may show variation among factors such as students, classroom populations and ages. In such cases, the appropriate model for meta-analysis is the random effect model.

It is important for a meta-analysis to correctly identify which model should be used for which type of research. As noted above, the choice of model should be made after identifying which pre-conditions are met by the studies. Borenstein et al. (2009) argued that to select a model based on the results of the heterogeneity test or to use the fixed effect model followed by the random effect model for the meta-analysis is not the correct approach and should be criticized. Further, the belief that the fixed effect model results in a stronger analysis is completely false. Therefore, it is not appropriate for researchers to use the fixed effect model under the assumption that it provides stronger results. The correct process is to select a model by ascertaining which features of the studies included in the meta-analysis meet the pre-conditions of the model.

1.6.1 Heterogeneity

A heterogeneity analysis is the measure that shows how the effect width differs from study to study. This statistic tests whether the effects found by the different studies are caused by a sampling error or by a systematic difference between the studies in addition to a sampling error (Hedges and Olkin 1985). The different effect sizes of the studies included in the meta-analyses make it necessary to find the size of the variance between the distributions. Therefore, heterogeneity tests are conducted to determine the conformity of the normal distribution of effect sizes. The impact value observed between studies show differences for two reasons. The first reason is the real heterogeneity of the effect size, and the second reason is related to errors within the studies. If researchers do not seek to test the heterogeneity, then they must separate the observed differences between the two components and focus on the first situation above (Borenstein et al. 2009).

The most common means of testing heterogeneity and determining whether the heterogeneity is statistically significant is the Q (df) statistic based on the χ^2 test. Structurally, all studies establish and test a null hypothesis to argue for a shared common effect (Hedges and Olkin 1985). Under the null hypothesis, the Q value should follow the degrees of freedom equal to k-1 and the central χ^2 distribution. When the effect sizes are heterogeneous, a statistically significant χ^2 value shows that the studies have different distributions and thus do not share a wide effect (Hedges and Olkin 1985). The Q calculation formulas for meta-analysis studies are complimentary and homogeneous to one another and can be calculated in three different ways. Although all studies use Q_{Total} to test the common effect size (that is, the heterogeneity), $Q_{Between}$ is used to test heterogeneity between studies, and Q_{Within} is used while testing the heterogeneity within each particular study. There is an equality in $Q_T = Q_B + Q_W$ (Hedges and Olkin 1985).

It is possible to test heterogeneity using several statistical techniques. The most common technique involves the Q statistic and is the sum of weighted squares, which aims to find the significance level of the differences observed in studies. T^2 is the variance of real effects. This value is used to calculate the weightings of studies under the random effect model. T is the standard deviation of real effects and is the same as the standard deviations of the effects of the same tests. This coefficient is used to predict the real effect distributions and is used when considering the important effects of these distributions. I^2 is the actual ratio of the observed distributions. The effects are not dependent on testing and can range in value from 0 to 100% (Borenstein et al. 2009).

1.7 Publication Bias

One of the components of greatest interest to researchers in meta-analysis studies is the effect of variance on the results observed. Have publication bias, the study design, sample characteristics or moderator variables influenced the observed effect? The identification of these or similar variables that have played a role in the resulting effect is important for meta-analysis and assists in the determination of correct results. This section attempts to explain the importance of publication bias in meta-analysis studies and how it is identified in meta-analysis studies.

Publication bias is based on the assumption that not all studies on a particular topics are published. Because studies that do not find statistically significant relationship or that find only a weak relationship are deemed unworthy of publication, they are believed to negatively affect the total effect or to create bias in increasing the average effect size (Borenstein et al. 2009; Kulinskaya et al. 2008). This publication bias effect, which can also be considered missing data, has a negative impact on the total effect of a meta-analysis. Therefore, publication bias should be considered in meta-analysis studies. To examine the publication bias of a study, researchers should consider the following questions (Borenstein et al. 2009):

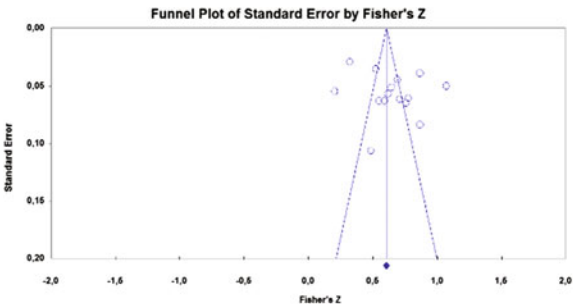
- Is there any evidence of publication bias?
- Is it possible that the general effect size is the result of publication bias?
- To what degree is the total effect due to publication bias?

To answer the above questions using statistical methods, a series of calculations are used in the meta-analysis. One of the most popular of these methods is the funnel plot method. The figure obtained with this method may not be completely objective, but it provides the opportunity to determine whether publication bias affects such studies. A funnel plot conducted for a meta-analysis is shown in Fig. 1.1.

In the funnel plot above, there is no evidence of publication bias for the studies included in the meta-analysis. To speak of a publication bias, the funnel plot would need to present a serious degree of asymmetry. If a concentration of studies were plotted at the bottom end of the funnel below the line indicating the average effect size and skewed to one end (especially toward the right side), then a publication bias would be evident. The figure of a funnel plot can be interpreted as not representing serious publication bias for the effect size of the related studies.

Statistical techniques in regard to publication bias are not limited to the funnel plot technique. The more frequent use of the funnel plot may be explained by the practicality in its application and the visual aspect. In addition, one of the other techniques developed by Rosenthal (1979) is the *failsafe N* or the *file drawer number* technique. This technique assumes that it is possible to calculate the actual number of missing studies and argues that finding studies to include in a meta-analysis is necessary before determining whether the p value is significant. The use of this technique assumes that the main effect of missing studies have no effect. In addition, there is also the Duval and Tweedie *Trim-and-Fill* method (Duval and Tweedie 2000), which uses a repeated technique to remove small

Fig. 1.1 Funnel plot of standard error by correlation coefficient (r)



studies at the extreme ends of the positive end of the funnel diagram. The trimming and filling process is repeated until the funnel diagram is symmetric in regard to the effect size (Duval 2005).

1.8 Sub-group Analysis and Moderator Analysis

A meta-analysis not only predicts the average effect based on all studies included in the analysis but also allows for the calculation of the average effects of various subgroups of studies and enables comparisons between these effects. Subgroup and moderator analyses are methods developed to test the statistical significance of differences between groups.

A subgroup analysis is a comparison of the effects of two or more groups. Three methods are used for the analysis of subgroups. A Z test is used to compare the average effect sizes of two groups, and a variance analysis or Q test is used to compare two or more groups. All three methods are based on mathematical formulas (Borenstein et al. 2009). Moderator analysis is an analysis method that attempts to test the differences between the average effect sizes of variables (moderators) and the direction of these differences. In a meta-analysis study, subgroup and moderator analysis are well planned in regard to the objective of the study, and the processes are conducted as planned (Littel et al. 2008).

The statistical significance between the difference of the subgroup analysis and moderator variables is tested using the Q statistic. In this method, Q is divided into two, as Q_{Within} (Q_w) and $Q_{between}$ (Q_b), and the analysis aims to find meaning based on the two Q values. Q_w attempts to test the homogeneity within the group or moderator and determines whether the variance within the groups is statistically significant, Q_b tests the homogeneity among groups or variables and attempts to determine whether the variance between the groups is statistically significant, and Q_T determines whether the groups are statistically significant (Borenstein et al. 2009; Hedges and Olkin 1985; Kulinskaya et al. 2008).

References

Borenstein, M., Hedges, L. V., Higgins, J. P. T., & Rothstein, H. R. (2009). *Introduction to meta-analysis*. UK: Wiley.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Hillside, NJ: Lawrence Erlbaum Associates.

Cohen, L., Manion, L., & Morrison, K. (2007). *Research methods in education*. Canada: Routledge.

Cooper, H. (1998). *Synthesizing research*. Thousand Oaks, CA: SAGE.

Cooper, H., & Hedges, L. V. (1994). *Handbook of research synthesis*. New York: Russell Sage Foundation.

Durlak, J. A. (1995). *Reading and understanding multivariate statistics.* Washington, DC: American Psychological Association.

Duval, S. (2005). The trim and fill method. In H. R. Rothstein, A. J. Sutton, & M. Bornstein (Eds.), *Publication bias in meta-analysis: Prevention, assessment, and adjustments* (pp. 11–33). Chichester, UK: Wiley.

Duval, S., & Tweedie, R. (2000). Trim and fill: A simple funnel-plot-based method of testing and adjusting for publication bias in meta-analysis. *Biometrics, 56,* 455–463.

Glass, G., McGaw, B., & Smith, M. L. (1981). *Meta-analysis in social research*. Beverly Hills: SAGE Publications.

Glass, G. V. (1976). Primary, secondary, and meta-analysis of research. *Educational Researcher, 5,* 3–8.

Glass, G. V., & Smith, M. K. (1978). Meta-analysis of research on the relationship of class size and achievement. *Educational Evaluation and Policy Analysis, 1,* 2–16.

Hedges, L. V., & Olkin, I. (1985). *Statistical method for meta-analysis*. United Kingdom: Academic Press.

Hunter, J. E., Schmidt, F. L., & Hunter, R. (1979). Differential validity of employment tests by race: A comprehensive review and analysis. *Psychological Bulletin, 86,* 721–735.

Kulinskaya, E., Morgenthaler, S., & Staudte, R. G. (2008). *Meta analysis: a guide to calibrating and combining statistical evidence*. London: Wiley.

Light, R. J., & Pillemer, D. B. (1984). *Summing up: The Science of Reviewing Research*. Cambridge, MA: Harvard University Press.

Littel, H. J., Corcoran, J., & Pillai, V. (2008). *Systematic reviews and meta-analysis*. New York: Oxford University Press.

Petitti, D. B. (2000). *Meta analysis, decision analysis and cost effectiveness analysis: Methods for quantitative synthesis in medicine*. New York: Oxford University Press.

Rosenthal, R. (1979). The file drawer problem and tolerance of null results. *Psychological Bulletin, 86,* 638–641.

Rosenthal, R., & Rubin, D. B. (1979). Interpersonal expectancy effects: The first 345 studies. *Behavioral and Brain Sciences, 3,* 377–386.

Smith, M. L., & Glass, G. V. (1977). Meta-analysis of psychotherapy outcome studies. *American Psychologist, 32,* 752–760.

Chapter 2
The Effect of Educational Leadership on Students' Achievement

Engin Karadağ, Fatih Bektaş, Nazım Çoğaltay and Mikail Yalçın

2.1 Introduction

The great man leadership approach, which dominated leadership discussions by the end of the 1800s, encouraged the emergence of the *trait leadership approach* at the beginning of 1900s. This period was characterized by the discussion of a "singularized power" and "authority." The source of this power and authority was the hierarchical power granted by the group to the leader because of the leader's innate traits. The concept that 'there is no significant correlation between leadership and physical properties and high intelligence' expressed in the studies conducted by Stogdill (1948, 1950) and Myers (1954) puts an end to the notion that a leader bears innate leadership traits that are specified in the trait approach and therefore puts an end to the trait approach. In addition, Stogdill (1948) expressed that capacity, success, responsibility, participation, and situational assessment constitute the sub-categories of the personal factors associated with leadership and that it was not possible to be a leader with certain traits. In the 1940s, *group leadership* began to

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prevail in the leadership field. Whyte (1943) described group leadership as an influence free from relationships based on power and self-interest. In group studies in the 1950s, the group approach was shown to be effective and concordantly paved the way for behavioral theories that attempted to explain leadership by the tendencies of the leader. These studies prompted the first experimental studies on leadership to be conducted at Ohio State University (Halpin and Winer 1957) and the University of Michigan (Katz and Kahn 1952), which were the sources of the first modern studies. In line with this development, in the 1960s, the *behavioral leadership approach* became recognized. Fiedler (1967) explained that the behavioral approach was designed to help employees perform their jobs in a coordinated manner. The Ohio State and Michigan studies discussed leadership in terms of two behavioral dimensions: consideration and initiating structure.

After this period, *situational leadership approaches* were conceived; these use the situation as the reference point. These theories are: *efficient leadership theory* (Fiedler 1967), which puts the tendency toward duty or relationships to the forefront; *3D leadership theory* (Reddin 1970), which adds the dimension of efficiency to the duty and relationship dimensions of situational leadership theory; *path-goal theory* (Hause 1971), which puts an emphasis on the leader's motivational roles; *situational leadership theory* (Hersey and Blanchard 1972), which associates the emergence of leaders to the situation rather than the person; and *normative leadership theory* (Vroom and Yetton 1973), which considers decision making the most important task performed by leaders.

After the 1990s, research based on new theories that were discovered included *shared leadership* (Gronn 2006), *distributed leadership* (Elmore 2000; Gronn 2000, 2002; Spilanne 2005), *servant leadership* (Greenleaf 2002), *ethical leadership* (Brown and Trevino 2006), *spiritual leadership* (Fry 2003) and *authentic leadership* (Gardner et al. 2011). As stated above, the discussion of the theory and classification regarding the concept of leadership has continued until today, and it seems that it will persist for years to come.

2.1.1 Educational Leadership: A Conception Framework

There are a variety of perspectives concerning leadership in terms of institutions and organizations, and it is a very popular research subject in the field of education (Krüger and Scheerens 2012). Leadership is associated with schools and administrators in education studies. School administrators are expected to guide all employees and students, support them, undertake all responsibility, and inspire them to meet the objectives of the school. Furthermore, school administrators pave the way for curriculum reform and the development of a positive learning environment (Cotton 2003; Hallinger 2005; Huber 2004; Nichols 2011).

Studies about school leaders accelerated with *effective school research* in the 1970s. Research conducted in England and North America found student achievement in certain schools to be greater than in other schools. The researchers argued that this situation could not be explained just by the unique individual and social characteristics of the students but that the real difference between the schools was to the leadership behaviors of the school administrators. Hence, educational leadership began to be discussed more frequently in education studies because of this finding (Bamburg and Andrews 1991; Krüger and Scheerens 2012; Ross and Gray 2006).

The school leader is the person who plans and maintains program development, allocates resources, improves the performance of employees and students by encouraging them, and guides them to meet the objectives of the school. Upon determining the objectives of the school, school leaders ensure that these objectives are stated and agreed upon with the students and teachers. Furthermore, these leaders manage the out-of-school activities. They direct the employee and student activities in other areas of the school, encourage local organizations to work with the school, and collaborate with families and business organizations (Busher et al. 2000). In conclusion, school leaders undertake the main responsibility of ensuring that student achievement is at its maximum potential.

The studies conducted on student achievement assume that there is a direct relationship between educational leadership and student learning. Additionally, it is thought that educational leadership has an indirect effect on student's learning (Balcı 2007; Bulris 2009). Despite the high number of studies that show that educational leadership does not have a direct effect on student's achievement, school leaders are generally held responsible for the achievement of students (Ross and Gray 2006). As reflected in the literature, the importance and size of this effect are multi-dimensional and open to discussion. Within this scope, school leaders focus on a common goal and learning objectives to create and maintain effective and successful schools (Leithwood and Riehl 2003).

Many researchers agree that school leaders have an important effect on all individuals who comprise the school community, particularly on teachers and students. However, the importance and extent of this influence is open to discussion has multi-dimensional characteristics. Furthermore, the effect of school leaders on students' learning and achievement levels, which are among the outputs—or results—of the school, is a complex issue. The outputs and student levels in question are affected by various in-school and out-of-school environmental factors. It is difficult to determine experimentally to what extent leadership affects in-school and out-of-school activities.

The fact that students do not interact only with teachers in their school suggests that many variables have an influence on the behaviors that students are supposed to display. The fact that the behaviors of school leaders, as one of the aforementioned variables, are the focus of a number of studies underlines the importance of this issue. Studies that aim to reveal the relationship between school leaders' various behaviors and student achievement associate the behaviors of school administrators with exams whose validity and reliability values were widely agreed upon. School leaders can achieve sustainable developments as a consequence of determining, measuring and controlling factors regarding and standards of school life, except for the tests on which students are expected to be successful (Schlechty 2005; Mullis et al. 2012).

2.1.2 Research Hypothesis

Today, many studies that investigate the effects of educational leadership on various organizational outputs are available. More specifically, the number of studies in this scope that investigate the effect of educational leadership on students and student achievement, which are the basic requirements of the school, is rapidly increasing. Many studies conducted within this scope have found a positive relationship between educational leadership and student achievement (Boyer 2012; Harris 2012a; Nelson 2012; Noe 2012; Raines 2012; Tindle 2012; Troutman 2012). Furthermore (*i*), leadership style is the manner and approach of providing direction, implementing plans, and motivating people. As observed by the employees, it includes the total pattern of explicit and implicit actions performed by their leader (Newstrom and Davis 1993), (*ii*) the courses studied to determine academic achievement through the research, and (*iii*) the level of education at the school where the research was conducted and that could affect the average influence obtained in this study, were determined as the moderator. Various studies found effects of leadership styles that were derived from theories of educational organization (such as instructional leadership) and theories of service and production-oriented organizations (such as transformational leadership) on student achievement for the moderator of leadership styles (Schrum and Levin 2013; Shatzer et al. 2013; Shin et al. 2013). In this context, the most substantial moderator variables were leadership styles. Additionally, results of the studies were used to define the other moderators. For example, the findings of the researches examining the effect of leadership on the academic achievement in various lessons differ: Gulbin (2008) and Maeyer et al. (2007) found that the leadership does not have an effect on mathematics achievement while Braun (2008) and Estapa (2009) found that it has an effect on language achievement. The similar differences occur for the level of education at the schools: On one hand, Gulbin (2008) and Odegaard (2008) found that the leadership does not have an effect on the student achievement in secondary level. On the other hand, Davis (2010) and May (2010) explored that it has a considerably high effect on student achievement in elementary level. As can be seen in these researches, the effect of leadership on student achievement varies with both the Courses of studies and the level of education at the schools. With all these variables, in light of previous studies' results, the following hypotheses were tested in this study:

H_1 Educational leadership has a positive effect on students' academic achievement.
H_2 Leadership style is a moderating variable for the positive effect of educational leadership on students' academic achievement.
H_3 The courses studied to determine academic achievement within the studies is the moderating variable for the positive effect of educational leadership on students' academic achievement.
H_4 The level of education at the school within the studies is a moderating variable for the positive effect of educational leadership on students' academic achievement.

2.2 Method

2.2.1 Study Design

In this study, the effect of educational leadership on students' achievement was tested with a meta-analysis design. Meta-analysis is a design used to gather the results of several independent research studies on certain subjects and to apply a statistical analysis on the findings acquired (Littel et al. 2008; Petitti 2000; Wampold et al. 2000).

2.2.2 Review Strategy and Criteria for Inclusion/Exclusion

First, a literature review was performed in Proquest and Ebsco academic databases to determine the studies to be included in the meta-analysis. At this phase, the leadership term was taken as a base, and the terms *achievement*, *academic achievement*, *student achievement* were used in the title, keywords and abstract fields. Additionally, doctoral theses and research that was published in peer-reviewed journals were included in the analysis. The reason for the inclusion of dissertations was to remove the possible publication bias.

Several strategies were used to determine the appropriate research to include in the meta-analysis. First, the research process was reduced to certain keywords, titles, and abstracts, and 172 research articles/dissertations were selected upon reviewing all research conducted on leadership and student achievement. Then, the research abstracts were reviewed. Among these, 51 research articles/dissertations were not related to educational leadership, 40 research articles/dissertations did not specify r/R^2 values, and 11 research articles/dissertations were qualitative studies. Thus, 102 research articles/dissertations were excluded from the analysis. In the second phase, the remaining 70 research articles/dissertations were analyzed in detail; 57 of these articles/dissertations were found to be appropriate, and the other 13 were deemed inappropriate. Descriptive statistics on those 57 studies are given in Table 2.1.

Inclusion criteria defined for this study are as follows:

- The studies were conducted between 2008 and 2013.
- The studies include statistical information required for correlational meta-analysis.
- The studies measure educational leadership.

Table 2.1 Characteristics of the studies included in the meta-analysis

Variables		1	2	3	4	5	6	Total
Publication year of research		2013	2012	2011	2010	2009	2008	–
	n	5	10	12	12	10	8	57
	%	8.7	17.5	21.0	21.0	17.5	14.0	100
Type of research		Dissertations	Article					–
	n	50	7					57
	%	87.7	12.3					100
Leadership styles of research		Leadership practices	Transformational	Instructional	Distributed	Others		
	n	24	15	8	2	8		57
	%	42.1	26.3	14.0	3.5	14.0		100
Courses of research		Mixed	Math	Reading	Language			
	n	34	12	8	3			57
	%	59.6	21.0	14.0	5.2			100
The level of education at the school		Elementary	High	Middle	Mixed	Secondary		
	n	24	13	9	7	3		56
	%	42.1	22.8	15.7	12.2	5.2		100

2.2.3 Coding Process

Coding is a data extracting process during which clear data and data appropriate for research are extracted from the compiled information in the studies. A coding form was created before the analysis, and the coding was performed in accordance with this form. The main objective of this procedure was to develop a special coding system that was both general and unique enough not to miss the characteristics of any type of research. The coding form created for the study included the following components:

- References of the research
- Information on sampling
- Data collection tool(s)
- Information on methodology
- Quantitative values

The operational definition is to make the concepts of research testable and to explain the variables, standard observations and measurement processes according to the purpose. In this context, the definitions of the variables in the study are as follows:

- *Moderator variable*: the variables that are thought to cause the effect size distribution to become heterogeneous are leadership style, the level of education at the school, and the courses studied to determine academic achievement within the studies.
- *Student achievement*: the amount of knowledge and skills students obtain from a particular curriculum. The scores that students receive on examinations conducted by central or local authorities were used as the student achievement (math and reading skills) variable.
- *Distributive leadership*: Distributive leadership is more than the distribution of different leadership roles to teachers in schools; it draws a frame of how leadership practices are implemented (Bennett et al. 2003; Gronn 2003; Spillane et al. 2001; Spillane 2005).
- *Transformational leadership*: Transformational leadership was mentioned by Burns (1978) at first and then developed as a leadership theory by Bass et al. The main purpose of transformational leadership is to conduct an organizational transformation by adapting to a rapidly changing environment.
- *Instructional leadership*: Instructional leaders are strong, guiding, and target-oriented culture architects. Instructional leaders focus primarily on improving students' academic output by making the strategies and activities of the school compatible with the academic mission of the school (Hallinger 2005).
- *Leadership practices*: are based on the Leadership Practices Inventory developed by Kouzes and Posner (2010). Leadership practices are examined under

five main topics: modelling the way, inspiring a shared vision, challenging the process (taking risks to take the organization/institution a step further, seeking new ways, searching for opportunities), enabling others to act and encouraging the heart.
- *Other Leadership*: are the studies in which there is no theoretical style.

2.2.4 Statistical Processes

The effect size acquired in the meta-analysis is a standard measure value used to determine the strength and direction of the relationship in the study (Borenstein et al. 2009). Pearson's Correlation Coefficient (*r*) was determined to be the effect size in this study. The correlation coefficient is between +1 and −1, and this r-value is converted into the value stated in table *z* (Hedges and Olkin 1985). Provided that more than one correlation value is given between the same structure categories in correlational meta-analysis studies, two different approaches are used to determine which to use in the meta-analysis (Borenstein et al. 2009; Kulinskaya et al. 2008). In this study, (*i*) all concerned correlations were included in the analysis and accepted as independent studies if all correlations are independent (*for example*, if the same people gave different samples in a study) and (*ii*) the average of the correlations is used when dependent correlations are given (*for example*, if the values that are between the sub-dimensions of transformational leadership and student achievement or between the items falling under the same category with the leadership were given). There are a variety of methods to correct these average correlations; however, most of these methods can result in high correlation estimations (Schyns and Schilling 2013). In this study, a conservative estimation was used as the average correlation, which creates a conservative estimation of the entire correlation.

There are two main models in meta-analysis: the fixed effects model and the random effects model. To determine which model to use, whether the model's prerequisites were met by the characteristics of the research studies included in the meta-analysis were considered (Borenstein et al. 2009; Hedges and Olkin 1985; Kulinskaya et al. 2008; Littel et al. 2008; Wampold et al. 2000). The *fixed effects model* covers (*i*) the assumption that the research is the same in terms of functionality, and the objective is to estimate the effect size for only one population defined. If it is believed that the research is not equal in terms of functionality, and if generalizations through the estimated effect size are to be made for greater populations, then the model that should be used is the *random effects model*. When all conditions were taken into consideration, the *random effects model* was applied in the meta-analysis processes in this study. A comprehensive meta-analysis program was used in the meta-analysis processes.

2.2.5 Moderator Analysis

To Moderator analysis is an analysis method to test the direction of the differences between sub-groups and between the average effect sizes of the variables. Moderator analysis in a meta-analysis study is planned in accordance with the objective of the study, and the procedures are applied in accordance with this plan (Littel et al. 2008). The statistical significance of the difference between moderator variables is tested using the Q statistic method developed by Hedges and Olkin (1985). In this method, Q is divided into two variables, Q-between (Q_b) and Q-within (Q_w), and the analyses are conducted using these two separate Q_s. Qw tests the internal homogeneity of the moderator variable, and Q_b tests the homogeneity between the groups (Borenstein et al. 2009; Hedges and Olkin 1985; Kulinskaya et al. 2008).

In this study, only the Q_b values were given because only the statistical significance of the differences between moderators was required. In this study, three moderator variables were determined, which were thought to play a role in the average affect size. The first variable was the leadership styles; a different style was approached in each research study, each style was measured, and the relationship between this type of leadership style and the achievement level was reviewed. This moderating variable was the leadership criteria used.

In the study, the moderators of leadership styles include: (*i*) distributive leadership, (*ii*) transformational leadership, (*iii*) instructional leadership, (*iv*) leadership behaviors and (*v*) others. *Distributive leadership* is the process of distributing tasks between the leader and followers at first and then integrating the tasks completed by group members. Therefore, the function of distributive leadership is a process that involves apportioning tasks between group members and completing tasks based upon more than one leader (Spillane 2006). In this context, distributive leadership involves more than distributing different leadership roles to teachers in schools; it draws a frame of how leadership practices are implemented (Bennett et al. 2003; Gronn 2003; Spillane et al. 2004). *Transformational leadership* was first mentioned by Burns (1978) and then developed as a leadership theory by Bass et al. The main purpose of transformational leadership is to facilitate an organizational transformation by adapting to a rapidly changing environment. *Instructional leadership* is one of the most important concepts related to learning and education within school processes. Hallinger (2005) describes instructional leaders as strong, guiding, and target-oriented culture architects. Instructional leaders focus primarily on improving students' academic output by making the strategies and activities of the school compatible with the academic mission of the school. *Leadership practices are based* on the Leadership Practices Inventory developed by Kouzes and Posner (2010). Leadership practices are examined under five main topics: modelling the way, inspiring a shared vision, challenging the process (taking risks to take the organization/institution a step further, seeking new ways, searching for opportunities), enabling others to act and encouraging the heart. Studies under the title of *others* are the studies in which there is no theoretical style.

Second, the level of education at the schools in which the research studies were conducted was determined as a moderating variable because it was thought to affect the average effect size. Additionally, the courses, which are the subject matter of exams that measure student achievement, were evaluated in terms of whether they qualified as a moderator by considering the relationship with which lesson is examined into. In addition, the relevant sampling group was found to be a suitable moderating variable.

2.2.6 Reliability and Validity of the Study

The credibility of the results is considered to be one of the most important criteria in a meta-analysis. Reliability and validity are criteria that are commonly used in studies. Particularly in qualitative research, these concepts are the most important elements in determining scientificity. In this context, the things made for reliability and validity are as below:

The studies included in meta-analysis could not be inevitably identical. One of the most critical issues is to determine how many of these studies are similar. It cannot be assumed that there is an objective methodology, and it varies from study to study. In this context, the criteria for inclusion determined by the researchers are presented in the section of methodology in detail.

- Apples and pears can be considered a symbol of the limitations and the power of meta-analysis simultaneously. In this study, while determining the criteria for inclusion and exclusion, the field of study (leadership and student achievement) was evaluated by considering all the features together. The objective determined for student achievement was to evaluate overall achievement but not to evaluate special achievements (skill).
- The moderator analyses in the study allowed for some comparisons and for seeing the effect according to the moderators.
- The random effects model was used because the studies included in the meta-analysis could not be functionally equivalent.
- Sensitivity was shown for publication bias in this study. Publication bias was prevented by conducting the study on both published and unpublished studies. In addition, no evidence was observed of publication bias by a funnel plot or tests, and it was determined that effect size is not influenced by publication bias (*see* the Results section for publication bias findings).
- To determine the reliability of the coding system, two researchers performed the coding process, and *Cohen's Kappa* reliability coefficient between the coders was determined to be 0.93.
- The effect size calculations for each study included in the meta-analysis were presented in the Appendix.

The basic condition for a study that uses sampling to reveal facts is that samples represent the population in the best way. However, regardless of the strength of the sample, it will never be the same as the universe because of *sampling errors*, which are the total errors that occur incidentally due to the units included or excluded from the sample. If the study had an infinite sample, the sampling error would be zero. In contrast, the samples of the studies included in the meta-analysis were not infinite. Therefore, it was inevitable that a sampling error occurred in the studies. In this context, a random effects model was used instead of a fixed effects model with the assumption that the real effect size was the same in all studies. Additionally, publication bias and the normality of the effect size of the studies were included in meta-analysis (*see*; Borenstein et al. 2009).

2.2.7 Publication Bias

Publication bias is based on the assumption that research on a definite subject is not published completely. Because research with no statistically significant relationships or with low relationships is not considered valuable enough to be published, the total effect size is affected in a negative way, and the average effect size increases non-objectivity (Borenstein et al. 2009; Hanrahan et al. 2013; Kulinskaya et al. 2008). The effect of such publication bias, which can also be called lost data, affects the overall research investigation of meta-analysis studies in a negative way. In this sense, publication bias was considered in meta-analysis studies. For this study, the following questions were asked to analyze publication bias:

- Is there any evidence of publication bias?
- Is it possible that the general effect size is the result of any publication bias?
- How much of the total effect size is affiliated with the publication bias?

In meta-analyses, several calculation methods are used to give statistical answers to the questions covering the possibilities stated above. The most common method is the funnel plot. Answers given by this method may not be accurately objective; however, they offer the opportunity for us to see whether the studies are written with a publication bias. The funnel plots of the research included in the meta-analysis of this study are shown in Fig. 2.1. In Fig. 2.1, no evidence of the possibility of any effect of publication bias was observed. A funnel plot is expected to be asymmetric at a significant level in the case of any publication bias. In particular, intensification (particularly on the right) of the line exhibiting the average effect size of the research, which is to be intensified at the bottom of the funnel, is an indicator of the possibility of publication bias. In this study, no evidence of publication bias was observed in any of the 57 studies subjected to meta-analysis.

Although no publication bias was observed in funnel plot, the results of Duval and Tweedie's trim and fill test, which is applied to determine the effect size related

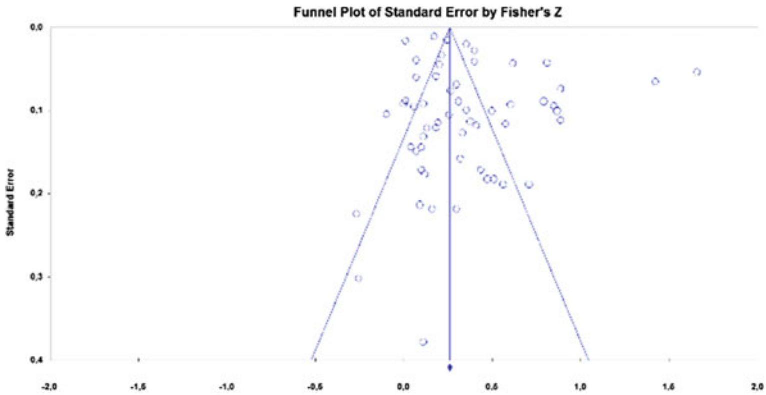

Fig. 2.1 Effect size funnel for publication bias

Table 2.2 The results of Duval and Tweedie's trim and fill test

	Excluding study	Point estimate	CI (confidence interval)		*Q*
			Lower limit	Upper limit	
Observed values		.34	.27	.41	1954.0
Adjustment values	0	.34	.27	.41	1954.0

to the publication bias acquired with the meta-analysis using the random effect model, are given in Table 2.2. As shown in Table 2.2, there is no difference between the effect observed and the artificial effect size created to fix the effect of the publication bias. The research on each side of the center line is symmetrical, which is the indicator of non-difference. Because there is no evidence indicating lost data at on either side of the centerline, the difference between the fixed effect size and the observed effect size is zero.

2.3 Findings

In Table 2.3, the meta-analysis of educational leadership and student achievement is shown. The findings supported H_1, which asserted that there was a positive relationship between educational leadership and achievement. Educational leaderships' value regarding the effect on student achievement was calculated as 0.34. This value reveals that educational leadership has a *medium-level effect* on student achievement (*see* Cohen 1988).

In the moderator analysis performed, it was found that H_2, based on the perspective that leadership style functioned as a moderator, was not supported. However, it was found that all leadership styles had significant and positive effects

Table 2.3 Correlations between educational leadership and student achievement: the results of meta-analysis

Concepts	k	N	*r*	CI		*Q*	Q_b
				Lower limit	Upper limit		
Leadership	57	28964	.34*	.27	.41	1954.01*	
Moderator [Leadership styles]							1.78
Others	8	11647	.33*	.13	.51		
Distributed	2	309	.42**	.03	.70		
Transformational	15	2169	.40*	.25	.53		
Leadership practices	24	9900	.35*	.23	.45		
Instructional	8	4939	.24**	.03	.43		
Moderator [Courses]							2.09
Mixed	34	16809	.36*	.25	.45		
Math	12	11148	.25*	.07	.41		
Reading	8	635	.43*	.22	.61		
Language	3	372	.37**	.03	.64		
Moderator [The level of education at the school]							4.55
Elementary	24	6843	.45*	.31	.57		
High	13	2908	.28*	.07	.47		
Mixed	7	9475	.26	−.03	.50		
Middle	9	6864	.30**	.05	.51		
Secondary	3	2823	.16	−.27	.54		

$^*p < 0.01$, $^{**}p < 0.05$

on student achievement. From the leadership styles obtained from the studies included in the meta-analysis, it was found that distributive [$r = 0.42$] and transformational [$r = 0.40$] leadership had a comprehensive effect on student achievement, leadership practices [$r = 0.35$] and other [$r = 0.33$] leadership styles had medium effect on student achievement, and educational leadership [$r = 0.24$] had low effect on student achievement. The strongest effect identified was distributive leadership. Notwithstanding the fact that the value of effect between leadership styles and students' achievement differs, in the moderator analysis performed according to the random effects model, the difference between the effect sizes of the leadership styles was not statistically significant ($Q_b = 1.78$, $p > 0.05$).

The findings did not support H3, which asserted that the courses studied to determine students' academic achievement was a mediating variable for the effect of educational leadership on students' academic achievement. In the moderator analysis performed, the effect size difference between the courses was not found to be statistically significant ($Q_b = 2.09$, $p > 0.05$). However, it was identified that educational leadership had a positive and significant effect on all courses. Within this scope, educational leadership had a medium effect on math [$r = 0.25$], mixed [$r = 0.36$] and language [$r = 0.37$] courses and had a comprehensive effect on reading [$r = 0.43$] courses.

H4, which asserted that the level of education at the school was the moderating variable regarding the effect of educational leadership on students' academic achievement, was not supported. In the moderator analysis performed, the effect sizes between the level of education at the schools was not statistically significant ($Q_b = 4.55$, $p > 0.05$). Within this scope, from the level of education at the school discussed in the studies included in the meta-analysis, it was found that educational leadership had a comprehensive effect on students' achievement in the elementary [$r = 0.45$] grades and that educational leadership had a medium effect on student achievement in the middle [$r = 0.30$] grades. In secondary [$r = 0.16$, $p > 0.05$] and mixed [$r = 0.26$, $p > 0.05$] grades, the effect of educational leadership on students achievement was not found to be statistically significant.

Additionally, it was concluded that the confidence intervals calculated for all moderators included in the meta-analysis were broad (leadership style, the level of education at the school, the lesson searched for the academic achievement within the studies). This finding illustrated that the studies included in the study had homogenous characteristics.

2.4 Conclusion

The aim of this meta-analysis was to analyze the overall results acquired from studies that examined the relationship between educational leadership and student achievement. The narrow confidence intervals in the meta-analysis indicate that the results of the research included in this study are reliable. This finding can be viewed as significant in terms of making more reliable decisions regarding the tendency and strength of the relationship-related results acquired by meta-analysis.

The meta-analysis results revealed that educational leadership had a medium-level positive effect on student achievement. When educational leadership studies were examined, it was found that leadership is associated with student achievement (Brewer 1993; Griffin 2008; Heck et al. 1990; Kythreotis et al. 2010; Leithwood and Mascall 2008). However, there are ongoing discussions as to whether this effect on student achievement is direct or indirect (Alig-Mielcarek and Hoy 2005; Hallinger et al. 1996; Louis et al. 2010; Witziers et al. 2003). Although some studies support that educational leadership directly affects student achievement (Fuller et al. 2011; Leithwood et al. 2008; Leithwood and Jantzi 2006), there are also some studies that conclude that it has an indirect effect on student achievement (Hallinger et al. 1996; Mark and Printy 2003). In both cases, the medium and positive effect obtained in this meta-analysis study supported the literature. Furthermore, the results of the study are parallel with the literature on leadership and student achievement conducted by Chin (2007, $r = 0.48$), Hattie (2009, $r = 0.18$), Marzano et al. (2005, $r = 25$), Robinsin et al. (2009, $r = 43$), and Robinson et al. (2008, $r = 0.21$).

In the study, it was identified that leadership styles, the courses that are used in the measurement of students' achievement, the level of education at the school and the sampling group are not moderators in the relationship between educational leadership and student achievement. On the contrary, when the effect sizes of leadership styles on student achievement are examined, the literature supports that distributive (Heck and Hallinger 2009; Leithwood et al. 2009; Louis et al. 2010) and transformational (Chin 2007; Hardman 2011; Kantabutra 2005; Koh et al. 1995; Lea 2011; Leithwood and Jantzi 2000; Nash 2011; Sun and Leithwood 2012; Valentine and Prater 2011) leadership have a comprehensive effect. Education leaders who care about and heed the words of employees, taking personal requirements and interests into account, and in short displaying supportive behaviors in the organization, are the representatives of change in schools (Burns 1978; Bass 1999; Bass and Riggio 2006; Leithwood 1992; Yukl 1999). Education leaders contribute to the further improvement of student outputs through the transformation of school culture in addition to performing the duties regarding the coordination and assessment of the education system. Similarly, distributive leadership practices, as an important component of the achievement in the school, are in close relation to student achievement and school performance (Harris 2012b). When it is considered that human behaviors occur not as a result of individual knowledge and skills but as a function distributed over individuals and situations, it is also inevitable that there will be distribution of these roles to the individuals and situations. In this case, leadership duties in the school are distributed to various leaders such as school principals, vice principals, curriculum experts, class masters and branch teachers (Spillane et al. 2001). It was also an expected result that instructional leadership had a more significant effect on student achievement than did leadership styles. This is because instructional leadership is one of the most important concepts related to learning and education within school processes. Hallinger (2005) describes instructional leaders as strong, guiding, and target-oriented culture architects. Instructional leaders focus primarily on improving students' academic output by making the strategies and activities of the school compatible with the academic mission of the school. The positive effect of instructional leadership on student achievement is supported by the literature (Eberts et al. 2002; Hallinger et al. 1996; Lee et al. 2012; O'Donnell and White 2005; Valentine and Prater 2011). When the findings of leadership styles moderator are examined as a whole, it is observed that instructional leadership has a weaker effect. It is thought that the most important reasons for this result are leadership scales. The Multifactor Leadership Questionnaire (Bass and Avalieo 1997) was used nearly in all transformational studies included in meta-analysis, and the Leadership Practices Inventory (LPI; Kouzes and Posner 2010) was used in the studies based on leadership practices. However, the scales used for instructional leadership are various.

When educational leadership's effect on student achievement in terms of the courses used in the measurement of students' achievement was examined, it was found that all courses had significant and positive effects. In terms of the level of education at the school, it was detected that educational leadership had an intermediate and comprehensive effect at the elementary, high school and middle school levels. It was identified that educational leadership in elementary school had a comprehensive effect on student achievement and in middle school and high grades had a medium effect on student achievement. When considering the administrative and executive features that the level of education at the school had, such as students' ages, the mission assumed for the education grade, and similar variables, it was an anticipated result that educational leadership's effect on student achievement varied in favor of the lower grades. The studies conducted supported the finding that the effect of leadership on student achievement in primary school was higher than for secondary and high schools (Louis et al. 2010; Witziers et al. 2003; Karadağ et al. 2015).

References

Note. "*" References marked with an asterisk indicate studies included in the meta-analysis. The in-text citations to studies selected for meta-analysis are not followed by asterisks.

Alig-Mielcarek, J. M., & Hoy, W. K. (2005). Instructional leadership: Its nature, meaning, and influence. In C. G. Miskel & W. K. Hoy (Eds.), *Educational leadership and reform* (pp. 29–54). Greenwich, CT: Information Age Publishing.

Anderson-Davis, D. M. (2012). *A correlational study: Determining the relationship between superintendents' leadership behaviors and student achievement in Indiana* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3535969).*

Babb, C. A. (2012). *An analysis of the relationship between organizational servant leadership and student achievement in middle level schools* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3515476).*

Balcı, A. (2007). *Etkili okul geliştirme kuram, uygulama ve araştırma [Effective school development; Theory, practice and research]*. Ankara: Pegema.

Bamburg, J. D., & Andrews, R. L. (1991). School goals, principals and achievement. *School Effectiveness & School Improvement, 2*(3), 175–191.

Bass, B. M. (1999). Two decades of research and development in transformational leadership. *European Journal of Work and Organizational Psychology, 8*(1), 9–32.

Bass, B. M., & Avolio, B. J. (1997). *Full range leadership development: Manual for the Multifactor Leadership Questionnaire* (pp. 43–44). Palo Alto, CA: Mind Garden.

Bass, B. M., & Riggio, R. E. (2006). *Transformational leadership*. New Jersey: Lawrence Erlbaum Associates.

Bell, J. S. (2012). *The relationship between teachers' and principals' perceptions of leadership effectiveness as they relate to student achievement in Alabama* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3528746).*

Bennett, N., Harvey, J. A., Wise, C., & Woods, P. A. (2003). *Distributed leadership: A desk study*. See reviews at: http://www.ncsl.org.uk/literature

Borenstein, M., Hedges, L. V., Higgins, J. P. T., & Rothstein, H. R. (2009). *Introduction to meta-analysis*. UK: Wiley.

Boyer, D. P. (2012). *A study of the relationship between the servant leader principal on school culture and student achievement in the lower Kuskokwim school district* (Unpublished doctoral dissertation). Grand Canyon University, Arizona.

Bozman, C. E. (2011). *The effects of principals' leadership styles, teacher efficacy, and teachers' trust in their principals on student achievement* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3468683).*

Braun, D. (2008). *The relationship among essential school leadership preparation practices, principal leader behavior, school learning environment, and student achievement in elementary and middle schools in Rhode Island* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3321561).*

Brewer, D. J. (1993). Principals and student outcomes: Evidence from U.S. high schools. *Economics of Education Review, 12*(4), 281–292.

Brown, M. E., & Trevino, L. K. (2006). Ethical leadership: A review and future directions. *The Leadership Quarterly, 17,* 595–616.

Brown, S. (2010). *An exploration of the relationship between principal leadership efficacy, principal computer self-efficacy, and student achievement* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3417737).*

Bulris, M. E. (2009). *A meta-analysis of research on the mediated effects of principal leadership on student achievement: Examining the effect size of school culture on student achievement as an indicator of teacher effectiveness* (Unpublished doctoral dissertation). East Carolina University, North Carolina.

Burns, J. M. (1978). *Leadership*. New York: Harper & Row.

Busher, H., Harris, A., & Wise, C. (2000). *Subject leadership and school improvement*. USA: Paul Chapman.

Calvert, M. K. H. (2013). *Administrator leadership and content knowledge: Effects on literacy achievement on male students grades four through eight* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3587606).*

Chin, J. M. C. (2007). Meta-analysis of transformational school leadership effects on school outcomes in Taiwan and the USA. *Asia Pacific Education Review, 8*(2), 166–177.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Hillside, NJ: Lawrence Erlbaum Associates.

Constantino, M. E. (2011). *The relationship between special education teachers' perceptions of principal leadership behaviors and the achievement of students with disabilities* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3491805).*

Cotton, K. (2003). *Principals and student achievement: What the research says?*. USA: ASCD.

Crain, F. S. (2010). *The effect of leadership styles on student achievement in title elementary schools* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3411203).*

Davis, B. W. (2010). *The relationship of principal leadership style as it affects school climate and student achievement* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3425719).*

Eberts, R. W., Hollenbeck, K., & Stone, J. A. (2002). Teacher performance incentives and student outcomes. *The Journal of Human Resources, 37*(4), 913–927.

Edwards, J. M. (2010). *Dimensions of literacy leadership: An analysis of middle-level principals' literacy leadership proficiencies and student reading achievement* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3397792).*

Elmore, R. F. (2000). *Building a new structure for school leadership*. New Jersey: The Albert Shanker Institute.

Estapa, A. L. (2009). *The relationship between the transformational leadership characteristics of principals, as perceived by teachers, and student achievement on standardized tests* (Doctoral dissertations). Available from ProQuest Dissertations and Theses database. (UMI NO: 3378413).*

Fiedler, F. E. (1967). *A theory of leadership effectiveness*. New York, NY: McGraw-Hill.

Fry, L. W. (2003). Toward a theory of spiritual leadership. *The Leadership Quarterly, 14,* 693–727.

Fuller, E., Young, M., & Baker, B. D. (2011). Do principal preparation programs influence student achievement through the building of teacher-team qualifications by the principal? An exploratory analysis. *Educational Administration Quarterly, 47*(1), 173–216.

Gamble, P. C. (2009). *The relationship between principals' leadership styles and student achievement that meet adequately yearly progress goals* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3370939).*

Gardner, W. L., Cogliser, C. C., Davis, K. M., & Dickens, M. P. (2011). Authentic leadership: A review of the literature and research agenda. *The Leadership Quarterly, 22,* 1120–1145.

Greb, W. (2011). *Principal leadership and student achievement: what is the effect of transformational leadership in conjunction with instructional leadership on student achievement?* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3468985).*

Greenleaf, R. K. (2002). *Essentials of servant leadership in focus on leadership*. New York: Wiley.

Griffin, S. E. (2008). *Relationship of principal leadership and school and teacher effects on student performance within a principal accountability system* (Unpublished doctoral dissertation). University of South Carolina, Columbia.

Gronn, P. (2000). Distributed properties: A new architecture for leadership. *Educational Management and Administration, 28*(3), 338–371.

Gronn, P. (2002). Distrubuted leadership as a unit of analysis. *The Leadership Quarterly, 13,* 423–451.

Gronn, P. (2003). *The new work of educational leaders: Changing leadership practice in an era of school reform*. London: Paul Chapman.

Gronn, P. (2006). The significance of distributed leadership. *Educational Leadership Research, 7,* 160–172.

Gulbin, K. M. (2008). *Transformational leadership: Is it a factor for improving student achievement in high poverty secondary schools in Pennsylvania?* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3303551).*

Hallinger, P. (2005). Instructional leadership and the school principal: A passing fancy that refuses to fade away. *Leadership and Policy in Schools, 4*(3), 221–239.

Hallinger, P., Bickman, L., & Davis, K. (1996). School context, principal leadership and student reading achievement. *The Elementary School Journal, 96*(5), 527–549.

Halpin, A. W., & Winer, B. J. (1957). A factorial study of the leader behavior descriptions. In R. M. Stogdill & A. E. Coons (Eds.), *Leader behavior: Its description and measurement* (pp. 399–451). Columbus, OH: Bureau of Business Research, Ohio State University.

Hattie, J. (2009). *Visible learning: A synthesis of over 800 meta-analyses relating to achievement*. London, UK: Routledge.

Hanrahan, F., Field, A. P., Jones, F. W., & Davey, G. C. L. (2013). A meta-analysis of cognitive therapy for worry in generalized anxiety disorder. *Clinical Psychology Review, 33*(1), 120–132.

Hardman, B. K. (2011). *Teacher's perception of their principal's leadership style and the effects on student achievement in improving and non-improving schools* (Unpublished doctoral dissertation). University of South Florida, Florida.

Harnish, D. A. (2012). *Principals' leadership styles and student achievement* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3510284).*

Harris, A. (2012a). Distributed leadership: Implications for the role of the principal. *Journal of Management Development, 31*(1), 7–17.

Harris, C. E. S. (2012b). *A study of the effect of secondary school leadership styles on student achievement in selected secondary schools in Louisiana* (Unpublished doctoral dissertation). University of Louisiana, Louisiana.

*Hastings, C. S. (2011). *The impact of leadership work practices on student achievement* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3486990).*

Hause, R. J. (1971). A path-goal theory effectiveness. *Administrative Science Quarterly, 16,* 321–328.

Heck, R. H., & Hallinger, P. (2009). Assessing the contribution of distributed leadership to school improvement and growth in math achievement. *American Educational Research Journal, 46* (3), 659–689.

Heck, R. H., Larsen, T. J., & Marcoulides, G. A. (1990). Instructional leadership and school achievement: Validation of a causal model. *Educational Administration Quarterly, 26*(2), 94–125.

Hedges, L. V., & Olkin, I. (1985). *Statistical method for meta-analysis*. United Kingdom: Academic Press.

Hersey, P., & Blanchard, H. K. (1972). *Management of organization behavior*. Englewood Cliffs, NY: Prentice-Hall.

Hough, D. L., & Schmitt, V. L. (2011). An ex post facto examination of relationships among the developmental designs professional development model/classroom management approach, school leadership, climate, student achievement, attendance, and behavior in high poverty middle grades schools. *Middle Grades Research Journal, 6*(3), 163–175.*

Huber, S. G. (2004). School leadership and leadership development. *Journal of Educational Administration, 42,* 669–684.

John, S. S. S. (2009). *Leadership styles and student achievement* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3355059).*

Jones, M. J. (2013). *The effect of school principals' leadership styles on elementary school students' reading achievement scores* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3589244).*

Kantabutra, S. (2005). Improving public school performance through vision-based leadership. *Asia Pacific Education Review, 6*(2), 124–136.

Karadağ, E., Bektaş, F., Çoğaltay, N., & Yalçın, M. (2015). The effect of educational leadership on students' academic achievement: a meta-analysis study. *Asia Pacific Education Review, 16*(1), 79–93.

Katz, D., & Kahn, R. L. (1952). Some recent findings in human relations research. In E. Swanson, T. Newcombe, & E. Hartley (Eds.), *Readings in social psychology* (pp. 650–665). New York, NY: Holt, Reinhart and Winston.

Knoeppel, R. C., & Rinehart, J. S. (2008). Student achievement and principal quality: Explaining the relationship. *Journal of School Leadership, 18*(5), 501–527.*

Koh, W. L., Steers, R. M., & Terborg, J. R. (1995). The effects of transformational leadership on teacher attitudes and student performance in Singapore. *Journal of Organizational Behavior, 16*(4), 319–333.

Kouzes, J. M., & Posner, B. Z. (2010). *The truth about leadership: The no-fads, heart-of-the matter facts you need to know*. San Francisco, CA: Jossey-Bass.

Krüger, M., & Scheerens, J. (2012). *Conceptual perspectives on school leadership*. In Scheerens, J. (Ed.), *School leadership effects revisited: A review and meta-analysis of empirical studies*. Berlin: Acid-Free Paper.

Kulinskaya, E., Morgenthaler, S., & Staudte, R. G. (2008). *Meta analysis: A guide to calibrating and combining statistical evidence*. London: Wiley.

Kythreotis, A., Pashiardis, P., & Kyriakides, L. (2010). The influence of school leadership styles and culture on students' achievement in Cyprus primary schools. *Journal of Educational Administration, 48*(2), 218–240.

Lambert-Knowles, P. (2013). *Impact of instructional leaders' distributed leadership practices on student achievement in charter high schools* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3587820).*

Lea, P. G. (2011). *High school principal leadership and student achievement: The effects of transformational leadership on the Illinois prairie state achievement examination* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI NO: 3454284).

Lee, M., Walker, A., & Chui, Y. K. (2012). Contrasting effects of instructional leadership practices on student learning in a high accountability context. *Journal of Educational Administration, 50* (5), 586–611.

Leithwood, K. (1992). The move toward transformational leadership. *Educational Leadership, 49* (5), 8–12.

Leithwood, K. A., & Riehl, C. (2003). *What do we already know about successful school leadership?*. Washington, DC: AERA Division A Task Force on Developing Research in Educational Leadership.

Leithwood, K., & Jantzi, D. (2000). The effects of transformational leadership on organizational conditions and student engagement with school. *Journal of Educational Administration, 38*(2), 112–129.

Leithwood, K., & Jantzi, D. (2006). Transformational school leadership for large-scale reform: Effects on students, teachers, and their classroom practices. *School Effectiveness and School Improvement, 17*(2), 201–227.

Leithwood, K., & Mascall, B. (2008). Collective leadership effects on student achievement. *Educational Administration Quarterly, 44*(4), 529–561.*

Leithwood, K., & Mascall, B. (2008). Collective leadership effects on student achievement. *Educational Administration Quarterly, 44*(4), 529–561.

Leithwood, K., Harris, A., & Hopkins, D. (2008). Seven strong claims about successful school leadership. *School Leadership and Management, 28*(1), 27–42.

Leithwood, K., Mascall, B., & Strauss, T. (2009). *Distributed leadership according to the evidence*. London: Routledge.

Lipkind, E. R. (2009). *Teacher, leadership, and curriculum factors predictive of student achievement in Indian educational for all* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3359359).*

Littel, H. J., Corcoran, J., & Pillai, V. (2008). *Systematic reviews and meta-analysis*. New York: Oxford University Press.

Louis, K. S., Dretzke, B., & Wahlstrom, K. (2010). How does leadership affect student achievement? Results from a national US survey. *School Effectiveness and School Improvement, 21*(3), 315–336.

Louis, K. S., Dretzke, B., & Whalstrom, K. (2010). How does leadership affect student achievement? Results from a national US survey. *School Effectiveness and School Improvement, 21*(3), 315–336.*

Maeyer, S. D., Rymenans, R., Petegem, P. V., Bergh, H. V. D., & Rijlaarsdam, G. (2007). Educational leadership and pupil achievement: The choice of a valid conceptual model to test effects in school effectiveness research. *School Effectiveness and School Improvement, 18*(2), 125–145.

Malloy, J. P. (2012). *Effects of distributed leadership on teachers' academic optimism and student achievement* (Unpublished Doctoral dissertation). University of Toronto, Toronto.*

Mark, H. M., & Printy, S. M. (2003). Principal leadership and school performance: An integration of transformational and instructional leadership. *Educational Administration Quarterly, 39*(3), 370–397.

Marzano, R. J., Waters, T., & McNulty, B. (2005). *School leadership that works: From research to results*. Aurora, CO: ASCD and McREL.

May, N. K. (2010). *The relationship between principal leadership styles and student achievement in elementary schools* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3404635).*

Mcguire, R. (2011). *The impact of school leadership on student achievement in Detroit charter schools* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3538869).*

Mees, G. W. (2008). *The relationship among principal leadership, school culture, and student achievement in Missouri middle schools* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3371083).*

Merturi, E. G. (2010). *The perceptions of principal-based leadership practices on student reading achievement* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3438405).*

Miller, R. V. (2011). *Leadership qualities that impact student achievement and gains in the elementary urban school* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3544987).*

Minus, E. L. (2010). *Leading in the middle: Leadership behaviors of middle level principals that promote student achievement* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3397616).*

Mitchell, S. P. (2011). *The frequency of superintendent' instructional leadership behaviors and student achievement* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3459457).*

Mora-Whitehurst, R. (2013). The relationship between elementary principals' visionary leadership and students' reading performance. *The Educational Forum, 77*, 315–328.*

Morrow, C. A. (2010). *An analysis of high school principals' technology use pertaining to instructional leadership impacting student achievement* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3411289).*

Mullis, I. V. S., Martin, M. O., Foy, P., & Arora, A. (2012). *TIMSS 2011 international results in mathematics*. Chestnut Hill, MA: TIMSS & PIRSLS International Study Center.

Murphy, M. F. (2012). *The self-perception of leadership efficacy of alternative school principals and its relationship to student achievement in the era of reform and accountability* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3548208).*

Myers, R. B. (1954). *The development and implications of a conception of leadership for leadership education*. Unpublished doctoral dissertation, University of Florida, Florida.

Nash, W. (2011). Transformational school leadership and student achievement: A case study. *National Teacher Education Journal, 4*(3), 9–18.

Nelson, A. L. (2012). *The relationship between middle school teachers' perceptions of principals' transformational leadership practices, teachers' sense of efficacy and student achievement* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3530736).*

Nelson, A. L. (2012). *The relationship between middle school teachers' perceptions of principals' transformational leadership practices, teachers' sense of efficacy and student achievement* (Unpublished doctoral dissertation). University of Southern Mississippi, Mississippi.

Newstrom, J. W., & Davis, K. (1993). *Behavior in organizations*. New York: McGraw-Hill.

Nichols, J. D. (2011). *Teachers as servant leaders*. United Kingdom: Rowman & Littlefield.

Noe, J. (2012). *The relationship between principal's emotional intelligence quotient, school culture and student achievement* (Unpublished doctoral dissertation). Liberty University, Virginia.

Odegaard, L. C. (2008). *The relationship between teacher-identified principal leadership behavior and effectiveness and student achievement in South Dakota secondary schools* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3318826).*

O'Donnell, R. J., & White, G. P. (2005). Within the accountability era: Principals' instructional leadership behaviors and student achievement. *NASSP Bulletin, 89*(645), 56–71.

Oduro, K. L. (2012). *High school principals' self-perception of leadership, self-efficacy and the academic achievement of African American students* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3523599).*

Petitti, D. B. (2000). *Meta-analysis, decision analysis and cost effectiveness analysis: Methods for quantitative synthesis in medicine*. New York: Oxford University Press.

Quinn, R. R. (2011). *The effect of elementary principals' self-perceived instructional leadership behaviors on reading and math student achievement* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3483953).*

Raines, P. L. (2012). *The role of the high school principal in improving student learning and achievement* (Unpublished doctoral dissertation). Regent University, Virginia.

Reardon, R. M. (2011). Elementary school principals' learning-centered leadership and educational outcomes: Implications for principals' professional development. *Leadership and Policy in Schools, 10*, 63–83.*
Reddin, W. J. (1970). *Effective management by objectives the 3D method of MBO*. New York, USA: McGraw-Hill.
Revis, K. G. (2010). *Superintendents' instructional leadership practices and the achievement of students with disabilities and students with limited English proficiency* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3412179).*
Rhoden, V. (2012). *The examination of the relationships among secondary principals' leadership behaviors, school climate, and student achievement in an urban context* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3517035).*
Rivers, S. D. (2010). *Leadership as a distributed phenomenon: A study of shared roles and 3rd grade student achievement* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3412486).*
Rodriguez, S. (2008). *A study of relationships among leadership, culture, and student achievement in Catholic schools* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3319730).*
Ross, J. A., & Gray, P. (2006). School leadership and student achievement: The mediating effects of teacher beliefs. *Canadian Journal of Education, 29*(3), 798–822.*
Robinsin, V., Hohepa, M., & Lyoyd, C. (2009). *School leadership and student outcomes: Identifying what works and why*. Wellington, New Zealand: New Zealand Ministry of Education.
Robinson, V. M., Lloyd, C. A., & Rowe, K. J. (2008). The impact of leadership on student outcomes: An analysis of the differential effects of leadership types. *Educational Administration Quarterly, 44*(5), 635–674.
Ryan, A. R. (2013). *An examination of the relation between self-perceived leadership practices of high school principals and student achievement* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3589558).*
Sandfort. G. R. (2009). *Principal leadership and student achievement: An examination of connections between structural, human resource, political, and symbolic leadership on performance outcomes on the California high school exit exam* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3379507).*
Schlechty, P. C. (2005). *Okulu yeniden kurmak.* (Çev. Y. Özden). Ankara: Nobel.
Schrum, L., & Levin, B. B. (2013). Leadership for twenty-first-century schools and student achievement: Lessons learned from three exemplary cases. *International Journal of Leadership in Education, 16*(4), 379–398.
Schyns, B., & Schillng, J. (2013). How bad are the effects of bad leaders? A meta analysis of destructive leadership and its outcomes. *The Leadership Quarterly, 24,* 138–158.
Shatzer, R. H. (2009). *A comparison study between instructional and transformational leadership theories: Effects on student achievement and teacher job satisfaction* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3399100).*
Shatzer, R. H., Caldarella, P., Hallam, P. R., & Brown, B. L. (2013). Comparing the effects of instructional and transformational leadership on student achievement: Implications for practice. *Educational Management Administration & Leadership, 29,* 1–15. doi:10.1177/1741143213502192
Sheldon, G. H. (2009). *The relationship between the leadership responsibilities of titles school principals and student achievement* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3399891).*
Shin, S. H., Slater, C. L., & Backhoff, E. (2013). Principal perceptions and student achievement in reading in Korea, Mexico, and the United States educational leadership, school autonomy, and use of test results. *Educational Administration Quarterly, 49*(3), 489–527.
Shumate, R. L. (2011). *Transformational versus transactional leadership: Which perceived leadership style has the stronger relationship between teacher efficacy and student*

achievement (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3460560).*

Spillane, J. (2005). Distributed leadership. *The Educational Forum, 69,* 143–150.

Spillane, J. P. (2006). *Distributed leadership*. San Francisco: Jossey-Bass.

Spillane, J. P., Halverson, R., & Diamond, J. B. (2001). Investigating school leadership practice: A distributed perspective. *Educational Researcher, 30*(3), 23–28.

Spillane, J. P., Halverson, R., & Diamond, J. B. (2004). Towards a theory of leadership practice: A distributed perspective. *Journal of Curriculum Studies, 36*(1), 3–34.

Stogdill, R. M. (1948). Personal factors associated with leadership: A survey of the literature. *Journal of Psychology, 25,* 35–71.

Stogdill, R. M. (1950). Leadership, membership, and organization. *Psychological Bulletin, 47,* 1–14.

Sun, J., & Leithwood, K. (2012). Transformational school leadership effects on student achievement. *Leadership and Policy in Schools, 11*(4), 418–451.

Terrell, H. P. (2010). *The relationship of the dimensions of distributed leadership in elementary schools of urban districts and student achievement* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3397678).*

Tindle, J. A. (2012). *Dimensions of principal support behaviors and their relationship to organizational citizenship behaviors and student achievement in high schools* (Unpublished doctoral dissertation). Virginia: The College of William and Mary.

Troutman, L. D. (2012). *The impact of principal leadership on school culture and student achievement* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3545656).*

Troutman, L. D. (2012). *The impact of principal leadership on school culture and student achievement* (Unpublished doctoral dissertation). North Carolina: Wingate University.

Valentine, J. W., & Prater, M. (2011). Instructional, transformational, and managerial leadership and student achievement: High school principals make a difference. *NASSP Bulletin, 95*(1), 5–30.

Vroom, V. H., & Yetton, P. W. (1973). *Leadership and decision making*. Pittsburg: University of Pittsburgh.

Wampold, B. E., Ahn, H., & Kim, D. (2000). Meta-analysis in the social sciences: A useful way to make sense of a series of findings from a large number of studies. *Asia Pacific Education Review, 1*(1), 67–74.

Whyte, W. F. (1943). *Street corner society*. Chicago, IL: University of Chicago.

Williams, E. (2009). Evaluation of a school systems plan to utilize teachers' perceptions of principal leadership to improve student achievement. *Challenge: A Journal of Research on African American Men, 15*(1), 15–32.*

Williams, M. D. (2009). *The relationship of principal leadership behaviors with school climate, teacher job satisfaction, and student achievement* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3367212).*

Williams, R. L. (2008). *The relationship between principals' leadership self-efficacy, student achievement and school performance* (Doctoral dissertations). Available from ProQuest Dissertations and Theses database. (UMI NO: 3346561).*

Witziers, B., Bosker, R. J., & Krüger, M. L. (2003). Educational leadership and student achievement: The elusive search for an association. *Educational Administration Quarterly, 39* (3), 398–425.

Yukl, G. (1999). An evaluation of conceptual weaknesses in transformational and charismatic leadership theories. *Leadership Quarterly, 10*(2), 285–305.

Chapter 3
The Effect of Motivation on Student Achievement

Sevil Orhan Özen

3.1 Introduction

The concept of motivation is considered as a crucial factor that affects human behavior and performance (Kian et al. 2014; Turan 2015). Especially educational researchers and practitioners express that motivation is one of the most important factors in student achievement and in ensuring continuious achievement (Alkış 2015; Aluçdibi and Ekici 2012; Guay et al. 2010; Pintrich 2003; Pintrich and Schunk 2002). Lin (2012) describes motivation as intrinsic desires which are already present in the individual or which are reflected in the individual while acquiring new information and learning. There are, however, in the literature other definitions of motivation; the latter word was derived from the word "movere" that means moving in Latin (Seiler et al. 2012). In this regard, according to Ertem (2006), motivation is an inner state uncovering individuals' behavior and directing them to these behaviors; however, according to Baumeister and Vohs (2007), it is a state where the individual displays various attitudes voluntarily in order to achieve a certain goal. Küçüközkan (2015) defined motivation as the sum of the efforts made for mobilizing the individual towards one or more particular goals and for ensuring the continuity of this movement, whereas according to Waterman (2005) it is a force representing the internal factors initiating the movements that should be performed to fulfill a need and the external factors that encourage this behavior. To summarize, there are three important factors in the concept of motivation. *(i)* Triggering the behavior of the individual that is required for a certain goal; *(ii)* guiding this behavior; and *(iii)* the internal state that initiates and guides this behavior.

The urge of satisfying the needs of the individual is the main source of motivation. In addition, many concepts, such as interest, values, attitude and desire of

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the individual towards an action, affect the process of motivation as well (Akpur 2015). Therefore, motivation has a multi-dimensional structure instead of a simple and basic one. In this regard, each individual may have a different amount of motivation. Deci and Ryan (2002) examined three categories of motivation that affects achievement:

(i). Intrinsic motivation: If the factors that direct the individual to a certain behavior comes from his own inner world, in a manner that is independent of the drives outside of the individual, this is intrinsic motivation (Ural 2009). The main sources of intrinsic motivation are the interest, curiosity and needs of the individual. Actions which are performed through intrinsic motivation and which originate from these sources are inherently rewarding for the individual, thus no additional motive or punishment is needed (Şen 2006). In this case, the individual is expected to display behaviors such as volunteerism, willingness and making a choice (Deci and Ryan 2000). Therefore, these actions usually generate intrinsic results as personal experiences which have a meaning for the individual (Erdoğan 2013). A study underlining the importance of intrinsic motivation indicated that students will learn a topic more easily if they are willing to apprehend and grasp this topic (Çelen 2010).

(ii). Extrinsic motivation: If the drive of the individual's behavior is independent of him, in other words if it lies in his environment, then this is extrinsic motivation. The behaviors which originate from external sources, such as rewards, punishment, and social support, are behaviors which are linked with the result of the individual's action (Erdoğan 2013). In this regard, the individual is not motivated by any interest in the action itself but rather he is motivated by the benefits that this action brings (Şen 2006). Some actions which are considered to be important for the students by teachers and parents are triggered by extrinsic motivation, and, therefore, they do not draw the intrinsic attention of individuals (Deci and Ryan 2016).

(iii). Amotivation: If individuals cannot establish a connection between their actions and the results of their actions there is no motivation, not and the individuals experience amotivation (Reeve 2014). In this case, individuals cannot make an association with the impact of their actions or the impact of their surroundings, and, thus, they cannot be motivated either intrinsically or extrinsically. Therefore, the individual who believes that his actions will not provide a benefit for him does not take any action and falls into the state of amotivation (Tahiroğlu and Aktepe 2015).

Apart from these motivation types, there are in the literature additional motivational components that give clues about the nature of the motivation of the individuals. Some of these components are directly related to the academic achievement of the individuals; these are intrinsic goal orientation, extrinsic goal orientation and the value of the subject, control of learning beliefs, self-sufficiency and test anxiety (Aktan and Tezci 2013; Bates et al. 2016). Moreover, these components are composed of three sub-components which are: *Value* that can be affected by the value of the subject and the intrinsic and extrinsic goal orientation; *expectation* that can be affected by the control of learning beliefs, self-sufficiency and performance; and *thrill* that can be affected by test anxiety and student's self-esteem level (Liu and Lin 2010). In addition to the different motivation types and components that are used in understanding the importance of motivation for student achievement, researchers on education use different motivation theories as well (Fortier et al. 1995). Expectation-value theory (Berndt and Miller 1990), goal theory (Meece and Holt 1993), self-sufficiency theory (Zimmerman et al. 1992) and the theory of intrinsic motivation (Deci and Ryan 1985) are some of these motivation theories. Moreover, the theories of Keller, Wlodkowski, Herzberg, Maslow, Mayo, McClelland, McGregor, Likert, Luthans and Vroom, which examine the relationship between achievement and motivation, have also revealed that motivation has an important effect on student learning (Dede and Yaman 2008).

The above literature review on motivation as a prerequisite for learning showed that the literature is mostly focused on the factors that make individuals to act and to pursue these actions (Liu et al. 2016). In particular, the studies underlining the importance of motivation as a factor that facilitates the learning achievements of the individuals (Karagüven 2012; Kaya 2013; Wolters and Rosenthal 2000) have argued that learning achievement and effectiveness may vary according to motivators such as interest, desire and need (Tahiroğlu and Aktepe 2015). In this regard, although there are studies showing that there is a positive relationship between intrinsic motivation and achievement (Burton et al. 2006; Lepper et al. 2005) there are studies suggesting that intrinsic and extrinsic motivation should be combined together in order to motivate an individual to get into action for a goal (Barrett et al. 2005; Gillet et al. 2009; Hayenga and Corpus 2010). It is important, therefore, to look at the relationship between these two variables and their effect on student achievement which are investigated in this study. Additionally, the factors that are thought to affect the average effect size generated by the study were set as moderators. These are (*i*) the *publication year* of the research, (*ii*) the *publication type* of the research, (*iii*) the *country (culture)* where the research was carried out, (*iv*) the *school subject*in which the achievement was measured, and (*v*) the *sample group* or level of education. All these variables, along with the results of previous research, were used to test the following hypotheses of this study:

$\mathbf{H_1}$ Motivation has a positive effect on student achievement.

$\mathbf{H_2}$ *Publication year* is a moderator for the positive effect of motivation on student achievement.

$\mathbf{H_3}$ *Publication type* is a moderator for the positive effect of motivation on student achievement.

$\mathbf{H_4}$ *Country (culture)* is a moderator for the positive effect of motivation on student achievement.

$\mathbf{H_5}$ *School subject* is a moderator for the positive effect of motivation on student achievement.

$\mathbf{H_6}$ *Sample group* is a moderator for the positive effect of motivation on student achievement.

3.2 Method

3.2.1 Study Design

In this study, the effect of motivation on student achievement was tested with a meta-analysis design.

3.2.2 Review Strategy and Criteria for Inclusion/Exclusion

To determine the research studies to include in the meta-analysis, the Science-Direct, Proquest and Ebsco academic databases were used to conduct a literature review. For this process, the terms motivation and student achievement included in the titles of the studies were used to screen the research studies. The end date for the research studies included in the research was identified as January 2016. Dissertations and peer-reviewed journals were included in the study.

Many strategies were used to identify the research studies that were appropriate for the meta-analysis of the study. First, a research study pool (956 research studies) was established; it included all studies with motivation and student achievement in their titles. The abstracts of these studies were reviewed, and all were found to be appropriate to include in the study. In the second stage, all research studies in the pool were examined in detail. The results of the examination found that 205 of the research studies in the pool were appropriate, and 751 were not found to be suitable. The descriptive statistics of the 205 research studies included in the analysis are presented in Table 3.1.

The criteria for inclusion of the research studies in the analysis study were identified as follows:

- To have the statistical information necessary for correlational meta-analysis (n and r, or R^2values)
- To be a study measuring the correlation motivation and student achievement

Reasons for not including a research study in the meta-analysis:

- Having no quantitative data (qualitative research)
- Not having a correlation coefficient
- Not focusing on student achievement
- Not focusing on motivation

Table 3.1 Characteristics of the studies included in the meta-analysis

Variables		1	2	3	4	5	6	Total
Publication year		2010	2011	2012	2013	2014	2015	
	n	36	33	30	34	39	33	205
	%	17.5	16	14.6	16.5	19	16	100
Publication type		Dissertations	Articles					
	n	49	156					205
	%	23.9	76.9					100
Country (culture)		Vertical-collectivist	Horizontal-individualist	Mixed culture				
	n	61	142	2				205
	%	29.7	69.2	0.9				100

3.2.3 Coding Process

The coding process was essentially a data sorting process used to ascertain which data were clear and suitable for the study. In this scope, a coding form was developed before the statistical analysis was conducted, and the coding was conducted according to the form. The main aim was to develop a specific coding system that allowed the study to see the entirety of the research studies in general and that would not miss any characteristics of each individual research study. The coding form developed in the study was comprised of:

- References for the research
- Publication year
- Publication type
- Country (Culture)
- School subject
- Sample group
- Data collection tool(s)
- Quantitative values

3.2.4 Statistical Processes

The effect size acquired in meta-analysis is a standard measure value used in the determination of the strength and direction of the relationship in the study (Borenstein et al. 2009). Pearson's correlation coefficient (r) was determined to be the effect size in this study. Because the correlation coefficient has a value between $+1$ and -1, the r value calculated was evaluated by converting this value into the value as it appears in the z table (Hedges and Olkin 1985). Provided that more than one correlation value is given between the same structure categories in correlational meta-analysis studies, two different approaches are used in the determination of the one to be used in the meta-analysis (Borenstein et al. 2009; Kulinskaya et al. 2008). For this study, (*i*) first, if the correlations were independent, all the related correlations were included in the analysis and were considered to be independent studies, and (*ii*) if there were dependent correlations, then the highest correlation value was accepted. A random effect model was used for the meta-analysis processes in this study. The Comprehensive Meta-Analysis program was used in the meta-analysis process.

3.2.5 Moderator Variables

To determine the statistical significance of the differences between the moderators of the study, only the Q_b values were used. Four moderator variables that were expected to have a role in the average effect size were identified in the study. The first of these considered is the publication year, as a moderator in regards to the relationship between motivation and student achievement. The second is the publication type which was thought to have a role on the average impact of motivation on student achievement. The rest are the country (culture), school subject and sample group.

3.2.6 Publication Bias

A funnel plot for the research studies included in the meta-analysis of can be seen in Fig. 3.1. Evidence that publication bias affected the research studies included in the meta-analysis can be seen in Fig. 3.1. A serious asymmetry would be expected in the funnel plot if there were a publication bias. The concentration of plots on one side under the line of average effect size, particularly in the bottom section of the funnel, suggests the probability of a publication bias in the research studies Evidence for publication bias was observed for the 205 research studies included in the meta-analysis study.

A publication bias was observed in the funnel plot, and the results of Duval and Tweedie's trim and fill test, which was applied to determine the effect size related to partiality in the publications that was acquired with the meta-analysis using the random effect model, are shown in. As seen in Table 3.2, there is a difference between the observed effect size and the virtual effect size established to correct the effect of the publication bias. The reason for the difference is the asymmetry of the concentration on both sides of the center line and the studies plotted to the left of and above the center line, skewing the symmetry.

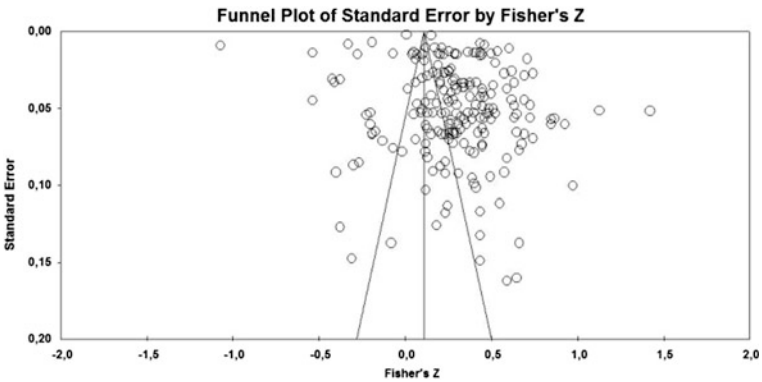

Fig. 3.1 Effect size funnel for publication bias

Table 3.2 Duval and Tweedie's trim and fill test results

	Excluded studies	Point estimate	*CI* (confidence interval)		*Q*
			Lover limit	Upper limit	
Observed values		0.10	0.11	0.27	52891.1
Corrected values	49	0.08	0.08	0.16	60053.4

3.3 Findings

The results of the meta-analysis about the relationship between motivation and student achievement are displayed in Table 3.3. The findings supported the hypothesis H_1 which stated that there is a positive relationship between motivation and student achievement. The effect size of motivation on student achievement was calculated as .27 which shows that motivation has a low level effect (see Cohen 1988) on student achievement.

The results of moderator analysis supported the hypothesis H_2 which stated that the publication year of the research plays a moderator role in the effect of motivation on student achievement. As a result of the moderator analysis, the differences between the effect size of the publication year of the research were found to be statistically significant ($Q_b = 4.32$, $p < .01$). According to studies published in 2010 [$r = .27$], 2011 [$r = .19$], 2012 [$r = .25$] and 2013 [$r = .26$] the effect of motivation on student achievement was at a low level, whereas according to the studies published in 2014 [$r = .32$] and 2015 [$r = .31$] this effect was at a medium level.

The findings of the research supported the hypothesis H_3 which stated that the publication type of the research plays a moderator role in the effect of motivation on student achievement. According to the moderator analysis, the difference between the effect size of the various publication types was found to be statistically significant ($Q_b = 5.20$, $p < .01$). In this context, the effect of motivation on student achievement has a low level in both papers [$r = .29$] and dissertations [$r = .19$] which is the most significant finding of this study.

The results of moderator analysis supported the hypothesis H_4 which formulated that the country (culture) where the research was carried out plays a moderator role in the effect of motivation on student achievement. According to the moderator analysis, the effect size differences according to the country of the research were not found to be statistically significant ($Q_b = 5.46$, $p < .01$). In this context, the effect of motivation on student achievement in the studies conducted with data collected from a mixed culture (both environments) [$r = -.18$] was lower level than both a vertical collectivist culture [$r = .27$] and a horizontal individualistic culture [$r = .28$].

Table 3.3 The findings of correlation between motivation and student achievement: meta-analysis results

Valuables	*k*	*N*	*r*	*CI* (confidence interval)		*Q*	Q_b
				Lover limit	Upper limit		
Motivation	205	772903	0.27*	0.23	0.31	52891.21	
Moderate [Publication year]							**4.32***
2010 year	36	285261	0.27	0.16	0.36		
2011 year	33	57415	0.19	0.08	0.30		
2012 year	30	35560	0.25	0.13	0.35		
2013 year	34	308666	0.26	0.16	0.36		
2014 year	39	30548	0.32	0.23	0.41		
2015 year	33	55453	0.31	0.21	0.41		
Moderate [Publication type]							**5.20***
Dissertations	49	65730	0.19	0.11	0.27		
Articles	156	707173	0.29	0.25	0.33		
Moderate [Country (culture)]							**5.46***
Vertical collectivist	61	300534	0.27	0.20	0.33		
Horizontal individualist	142	456898	0.28	0.23	0.32		
Mixed culture	2	15471	−0.18	−0.52	0.20		
Moderate [School subject]							**5.87***
Academic	87	62892	0.23	0.16	0.30		
Science	18	47422	0.28	0.12	0.42		
Language	19	8627	0.34	0.20	0.48		
Mathematic	57	439444	0.32	0.23	0.40		
Reading	21	204317	0.26	0.12	0.40		
Game	1	5380	0.41	−0.24	0.80		
Social Sciences	2	4821	−0.06	−0.50	0.39		
Moderate [Sample group]							**15.8***
Primary School	13	21272	0.53	0.42	0.63		
Secondary School	69	147751	0.28	0.21	0.34		
High School	67	562819	0.26	0.20	0.32		
University	59	30179	0.23	0.16	0.30		
Mixed	6	10882	0.28	0.07	0.46		

$^*p < .01$

The outcomes of moderator analysis supported the hypothesis H_5 which formulated that the school subject in which the achievement was measured plays a moderator role in the effect of motivation on student achievement. According to the moderator analysis, the effect size differences between the school subject were found to be statistically significant ($Q_b = 5.87, p < .01$). The effect of motivation on student achievement was at a medium level for language [$r = .34$], mathematic [$r = .32$] and game [$r = .41$] school subject, whereas it was at a low level for academic [$r = .23$], science [$r = .28$], social sciences [$r = -.06$] and reading [$r = .21$] school subjects.

Finally, the findings of the moderator analysis supported the hypothesis H_6 which formulated that the sample group plays a moderator role in the effect of motivation on student achievement. According to the moderator analysis, the effect size differences between the levels of education were found to be statistically significant ($Q_b = 15.8$, $p < .01$). In this regard, the effect of motivation on student achievement is high for primary school level [$r = .52$], whereas it is low for secondary school [$r = .25$], high school [$r = .26$], university [$r = .22$] and mixed culture [$r = .28$] levels. The most significant finding is that the highest effect size is seen at the studies conducted at primary school level.

3.4 Conclusion

This meta-analysis, which aimed to determine the effect size of motivation on student achievement, included 205 studies. In this research, the publication year, the publication type, the country (culture) where the research was carried out, the school subject in which the achievement was measured and the sample group were taken as moderator variables. The meta-analysis results showed that motivation has a low level positive effect on student achievement. In the literature, it is widely accepted that there are significant relationships between motivation and student achievement (Yazıcı and Altun 2013). In this regard, this finding supports the argument in the literature that there is a relationship between motivation and student achievement (Azizoğlu et al. 2015; Fini and Yousefzadeh 2011; McKenzie and Schweitzer 2001; Richardson et al. 2012; Sankaran and Bui 2001) and that motivation has an important role in student achievement (Karagüven 2012; Kaya 2013; Wolters and Rosenthal 2000).

The moderator analysis featuring the publication year showed that the effect size differences between years were significant. The highest effect was observed for studies published in 2014, whereas the lowest effect belongs to studies published in 2011. Similarly, the effect size differences of the other variables that were included in the moderator analysis, namely the country (culture) where the research was carried out and the school subject in which the achievement was measured, were significant either. Regarding the school subject, the highest effect size of motivation on student achievement was identified for game, language and mathematic. The examination of the effect sizes according to the country (culture) showed that the effect of motivation on student achievement varied among the vertical-collectivist and horizontal-individualistic cultures; both of them have a low effect. The finding that the country (culture) influence the relationship between motivation and achievement is in support of the study of Areepattamannil et al. (2011) which showed that Indian students who migrated to Canada had a higher motivation and academic achievement level than Canadian students.

According to the findings obtained from moderator analysis featuring the sample group and publication type variables, it was concluded that the sample group and publication type play a moderator role in the effect size of motivation on student achievement. The examination of the effect sizes according to publication type showed that the effect of motivation on student achievement has been founded at low level in both papers and dissertations. Concerning the findings of the sample group moderator analysis, where the sample groups were considered separately, motivation has a positive and significant high effect on student achievement at primary school, whereas the effect of motivation is low at secondary school, high school, university and mixed groups which include participants from all levels. Eymur and Geban (2011) found that students had higher motivation and experienced less amotivation in their first years which supports the results of moderator analysis. On their part, Yazıcı and Altun (2013) emphasized that finding out how the relationship between motivation and achievement is shaped according to the sample group is an important research topic. In their study they stated that extrinsic motivation sources were more effective on academic achievement during the first stages of education, whereas intrinsic motivation sources became more effective during later stages; they have also mentioned that the importance of motivational sources may decrease or increase according to the sample group.

After all, the results about the effect of motivation on student achievement can be summarized as below:

- Motivation has a positive low level effect on student achievement [r = .27].
- Regarding moderator variables, the publication year, publication type, the country (culture) where the research was carried out, the school subject and sample group play a moderator role in the effect size of motivation on student achievement.

On the basis of the findings obtained from this study, it is argued that the importance of motivation, which plays a role in student achievement, varies according to the sample group. This meta-analysis study is therefore important in that it suggests that the studies which focus on the relationship between motivation and student achievement should investigate more deeply the changes according to the sample group. Finally, this research suggests that there is a need to conduct further qualitative studies and comparative meta-analyses including motivation types as another moderator variable.

References

Note. "*" References marked with an asterisk indicate studies included in the meta-analysis. The in-text citations to studies selected for meta-analysis are not followed by asterisks.

Abdelfattah, F. (2010). The relationship between motivation and achievement in low-stakes examinations. *Social Behavior and Personality: An International Journal, 38*(2), 159–167.*

Acat, M. B., & Dereli, E. (2012). Preschool teaching students' prediction of decision making strategies and academic achievement on learning motivations. *Educational Sciences: Theory and Practice, 12*(4), 2670–2678.*

Aktan, S., & Tezci, E. (2013). Matematik motivasyon ölçeği (MMÖ) geçerlik ve güvenirlik çalışması. *The Journal of Academic Social Science Studies, 6,* 57–77.

Akpur, U. (2015). *The relationship pattern between English prep school students' academic achievement and their academic motivation, anxiety and attitudes.* Unpublished Master Dissertation. Yıldız Teknik University, İstanbul.

Al-Qahtani, M. F. (2013). Relationship between English language, learning strategies, attitudes, motivation, and students' academic achievement. *Education in Medicine Journal, 5*(3).*

Allen, D. (2011). *Influence of science and technology magnet middle schools on students' motivation and achievement in science* (Unpublished Doctoral Dissertation). Texas State University, San Marcos, Texas.*

Alkış, N. (2015). *The influence of personality traits, motivation and persuasion principles on academic performance* (Unpublished Doctoral Dissertation). Middle East Technical University, Ankara.

Aluçdibi, F., & Ekici, G. (2012). The effect of biology teachers' classroom management profiles on the biology course motivation level of the high school students. *Hacettepe University Journal of Education, 43,* 25–36.

Ann, H. C. (2014). *Math talent development of elementary school students: the relationship of gender, math motivation, and goal orientation to math achievement* (Unpublished Doctoral Dissertation). The College of William and Mary, Virginia.*

Areepattamannil, S. (2011). *Academic self-concept, academic motivation, academic engagement and academic achievement: A mixed method study of Indian Adolescents in Canada and India* (Doctoral Dissertation). Queen's University, Ontario.*

Areepattamannil, S. (2012). Mediational role of academic motivation in the association between school self-concept and school achievement among Indian adolescents in Canada and India. *Social Psychology of Education, 15*(3), 367–386.*

Areepattamannil, S. (2014). Relationship between academic motivation and mathematics achievement among Indian adolescents in Canada and India. *The Journal of General Psychology, 141*(3), 247–262.*

Areepattamannil, S., Freeman, J. G., & Klinger, D. A. (2011). Intrinsic motivation, extrinsic motivation, and academic achievement among Indian adolescents in Canada and India. *Social Psychology of Education, 14*(3), 427–439.*

Azizoğlu, N., Aslan, S., & Pekcan, S. (2015). The periodic system and teaching with analogies model: The effects of teaching method, gender and motivation on students' achievement. *Elementary Education Online, 14*(2), 472–488.

Baeten, M., Dochy, F., & Struyven, K. (2013). The effects of different learning environments on students' motivation for learning and their achievement. *British Journal of Educational Psychology, 83*(3), 484–501.*

Barrett, A. N., Barile, J. P., Malm, E. K., & Weaver, S. R. (2012). English proficiency and peer interethnic relations as predictors of math achievement among Latino and Asian immigrant students. *Journal of Adolescence, 35*(6), 1619–1628.*

Barrett, D. W., Patock-Peckham, J. A., Hutchinson, G. T., & Nagoshi, C. T. (2005). Cognitive motivation and religious orientation. *Personality and Individual Differences, 38*(2), 461–474.

Bates, C. C., D'Agostino, J. V., Gambrell, L., & Xu, M. (2016). Reading recovery: Exploring the effects on first graders' reading motivation and achievement. *Journal of Education for Students Placed at Risk, 21,* 47–59.

Baumeister, R. F., & Vohs, K. D. (2007). Self-regulation, ego depletion, and motivation. *Social and Personality Psychology Compass, 1*(1), 115–128.

Bembenutty, H., & White, M. C. (2013). Academic performance and satisfaction with homework completion among college students. *Learning and Individual Differences, 24,* 83–88.*

Bergsmann, E. M., Lüftenegger, M., Jöstl, G., Schober, B., & Spiel, C. (2013). The role of classroom structure in fostering students' school functioning: A comprehensive and application-oriented approach. *Learning and Individual Differences, 26,* 131–138.*

Bernardo, A. B. (2010). Exploring Filipino adolescents' perceptions of the legitimacy of parental authority over academic behaviors. *Journal of Applied Developmental Psychology, 31*(4), 273–280.*

Berndt, T. J., & Miller, K. E. (1990). Expectancies, values, and achievement in junior high school. *Journal of Educational Psychology, 82*(2), 319–326.

Bialis-White, L. H. (2013). *Needs-satisfaction, motivation, and achievement in high school students: Testing predictive models by gender and ethnicity* (Unpublished Doctoral Dissertation). University of California, Berkeley.*

Bolen, J. A. (2011). *Spatial ability, motivation, and attitude of students as related to science achievement* (Unpublished Doctoral Dissertation). University of North Texas, USA.*

Bong, M., Cho, C., Ahn, H. S., & Kim, H. J. (2012). Comparison of self-beliefs for predicting student motivation and achievement. *The Journal of Educational Research, 105*(5), 336–352.*

Borenstein, M., Hedges, L. V., Higgins, J. P. T., & Rothstein, H. R. (2009). *Introduction to meta-analysis*. Chichester, UK: Wiley.

Bozack, A. R., & Salvaggio, A. N. (2013). Relational effects of reading motivation and academic achievement among adolescent boys. *Reading Psychology, 34*(6), 507–522.*

Bråten, I., Ferguson, L. E., Anmarkrud, Ø., Strømsø, H. I., & Brandmo, C. (2014). Modeling relations between students' justification for knowing beliefs in science, motivation for understanding what they read in science, and science achievement. *International Journal of Educational Research, 66*, 1–12.*

Bryan, R. R., Glynn, S. M., & Kittleson, J. M. (2011). Motivation, achievement, and advanced placement intent of high school students learning science. *Science Education, 95*(6), 1049–1065.*

Buff, A., Reusser, K., Rakoczy, K., & Pauli, C. (2011). Activating positive affective experiences in the classroom: "Nice to have" or something more? *Learning and Instruction, 21*(3), 452–466.*

Burnam, A., Komarraju, M., Hamel, R., & Nadler, D. R. (2014). Do adaptive perfectionism and self-determined motivation reduce academic procrastination? *Learning and Individual Differences, 36*, 165–172.*

Burton, K. D., Lydon, J. E., D'Alessandro, D. U., & Koestner, R. (2006). The differential effects of intrinsic and identified motivation on well-being and performance: Prospective, experimental, and implicit approaches to self-determination theory. *Journal of Personality and Social Psychology, 91,* 750–762. doi:10.1037/0022-3514.91.4.750

Butzler, K. B. (2014). *The effects of motivation on achievement and satisfaction in a flipped classroom learning environment* (Unpublished Doctoral dissertation). Northcentral University, Prescott Valley, Arizona.*

Byrd, C. M. (2012). Student perceptions of racial climate in secondary education: Effects of climate's multiple dimensions on academic achievement and motivation (Unpublished Doctoral Dissertation). University of Michigan.*

Cabral-Márquez, C. (2011). *The effects of setting reading goals on reading motivation, reading achievement, and reading activity* (Unpublished Doctoral Dissertation). Northern Illinois University, De Kalb, Illinois.*

Chan, K. W., Wong, A. K. Y., & Lo, E. S. C. (2012). Relational analysis of intrinsic motivation, achievement goals, learning strategies and academic achievement for Hong Kong secondary students. *The Asia-Pacific Education Researcher, 21*(2), 230–243.*

Chen, H. K. (2012). Study of bilingual learning motivation and efficiency with traditional and multimedia call on-line approaches from perspectives of knowledge management: Quantitative and qualitative analysis of English learning achievement in Taiwan tertiary education. *The Journal of Global Business Management, 8*(2), 191–199.*

Chen, J. A., & Pajares, F. (2010). Implicit theories of ability of grade 6 science students: Relation to epistemological beliefs and academic motivation and achievement in science. *Contemporary Educational Psychology, 35*(1), 75–87.*

Chen, W. W., & Wong, Y. L. (2014). What my parents make me believe in learning: The role of filial piety in Hong Kong students' motivation and academic achievement. *International Journal of Psychology, 49*(4), 249–256.*

Cheng, S. Y. S. (2013). An empirical investigation of the effectiveness of project-based course learning within hospitality programs: The mediating role of cognitive engagement. *Journal of Hospitality, Leisure, Sport & Tourism Education, 13,* 213–225.*

Chiu, M. M., & Chow, B. W. Y. (2010). Culture, motivation, and reading achievement: High school students in 41 countries. *Learning and Individual Differences, 20*(6), 579–592.*

Choi, K., & Kim, D. Y. (2013). A cross cultural study of antecedents on career preparation behavior: Learning motivation, academic achievement, and career decision self-efficacy. *Journal of Hospitality, Leisure, Sport & Tourism Education, 13,* 19–32.*

Ciccarelli, S. M. (2015). *Psychology graduate students' motivation for academic achievement* (Unpublished Doctoral dissertation). Alliant International University, San Diego, California.*

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). New Jersey: Lawrence Erlbaum.

Cuskley, T. A. (2014). *Student achievement: Relations among intrinsic motivation, social-emotional skills, and hope* (Unpublished Doctoral dissertation). ST. John's University, New York, USA.*

Çelen, B. (2010). *The effects of the use of confirmative feedback in cyber based drills atmosphere? (CBDA) on motivation, academic success and permanent learning* (Unpublished Master Dissertation). Marmara University, İstanbul.

Çetin, B. (2015). Academic motivation and self-regulated learning in predicting academic achievement in college. *Journal of International Education Research, 11*(2), 95–106.*

De Castella, K., & Byrne, D. (2015). My intelligence may be more malleable than yours: The revised implicit theories of intelligence (self-theory) scale is a better predictor of achievement, motivation, and student disengagement. *European Journal of Psychology of Education, 30*(3), 245–267.*

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum Press.

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11,* 227–268. doi:10.1207/S15327965PLI1104_01

Deci, E. L., & Ryan, R. M. (2002). *Handbook of selfdetermination research*. Rochester, NY: University of Rochester Press.

Deci, E. L., & Ryan, R. M. (2016). Optimizing students' motivation in the era of testing and pressure: A self-determination theory perspective. In *Building autonomous learners*. Singapore: Springer.

Dede, Y., & Yaman, S. (2008). A questionnaire for motivation toward science learning: A validity and reliability study. *Necatibey Faculty of Education Electronic Journal of Science and Mathematics Education, 2*(1), 19–37.

DiBenedetto, M. K., & Bembenutty, H. (2013). Within the pipeline: Self-regulated learning, self-efficacy, and socialization among college students in science courses. *Learning and Individual Differences, 23*, 218–224.*

Di Domenico, S. I., & Fournier, M. A. (2015). Able, ready, and willing: Examining the additive and interactive effects of intelligence, conscientiousness, and autonomous motivation on undergraduate academic performance. *Learning and Individual Differences, 40*, 156–162.*

Dindar, M., & Akbulut, Y. (2015). Role of self-efficacy and social appearance anxiety on gaming motivations of MMOFPS players. *Computers & Education, 81,* 26–34.*

Dinger, F. C., Dickhäuser, O., Spinath, B., & Steinmayr, R. (2013). Antecedents and consequences of students' achievement goals: A mediation analysis. *Learning and Individual Differences, 28,* 90–101.*

Donnelly, C. (2012). *Motivation and learning strategies and their relationship to academic achievement in middle school students* (Doctoral dissertation). California State University, Long Beach.*

Duijnhouwer, H., Prins, F. J., & Stokking, K. M. (2012). Feedback providing improvement strategies and reflection on feedback use: Effects on students' writing motivation, process, and performance. *Learning and Instruction, 22*(3), 171–184.*

Dupont, S., Galand, B., & Nils, F. (2015). The impact of different sources of social support on academic performance: Intervening factors and mediated pathways in the case of master's thesis. *Revue Européenne de Psychologie Appliquée/European Review of Applied Psychology, 65*(5), 227–237.*

Erdem-Keklik, D., & Keklik, I. (2013). Motivation and learning strategies as predictors of high school students' math achievement. *Cukurova University Faculty of Education Journal, 42*(1), 96–109.*

Erdoğan, B. (2013). *The effect of adaptive learning management system on student's satisfaction, motivation and achievement in online learning* (Unpublished Doctoral dissertation). Ankara University, Ankara.

Ertem, H. (2006). *Investigation of secondary education students' motivation types (intrinsic and extrinsic) and levels towards chemistry course based on some variables* (Unpublished Master dissertation). Balıkesir University, Balıkesir.

Eymur, G., & Geban, Ö. (2011). An investigation of the relationship between motivation and academic achievement of pre-service chemistry teachers. *Education & Science, 36*(161).*

Fasciani, L. M. (2015). *The interrelations between academic motivation, irrational beliefs, and test anxiety in predicting achievement among high school students* (Unpublished Doctoral dissertation). St. John's University, New York, USA.*

Fini, A. A. S., & Yousefzadeh, M. (2011). Survey on relationship of achievement motivation, locus of control and academic achievement in high school students of Bandar Abbas (Iran). *Procedia Social and Behavioral Sciences, 30,* 866–870.

Freiberger, V., Steinmayr, R., & Spinath, B. (2012). Competence beliefs and perceived ability evaluations: How do they contribute to intrinsic motivation and achievement? *Learning and Individual Differences, 22*(4), 518–522.*

Freund, P. A., & Holling, H. (2011). Who wants to take an intelligence test? Personality and achievement motivation in the context of ability testing. *Personality and Individual Differences, 50*, 723–728.*

Freund, P. A., Kuhn, J. T., & Holling, H. (2011). Measuring current achievement motivation with the QCM: Short form development and investigation of measurement invariance. *Personality and Individual Differences, 51*(5), 629–634.*

Froiland, J. M., & Oros, E. (2014). Intrinsic motivation, perceived competence and classroom engagement as longitudinal predictors of adolescent reading achievement. *Educational Psychology, 34*(2), 119–132.*

Fortier, M. S., Vallerand, R. J., & Guay, F. (1995). Academic motivation and school performance: Toward a structural model. *Contemporary Educational Psychology, 20*(3), 257–274.

Förster, N., & Souvignier, E. (2014). Learning progress assessment and goal setting: Effects on reading achievement, reading motivation and reading self-concept. *Learning and Instruction, 32*, 91–100.*

Gherasim, L. R., Butnaru, S., & Iacob, L. M. (2011). The motivation, learning environment and school achievement. *The International Journal of Learning, 17*(12), 353–364.*

Gilbert, M. C., Musu-Gillette, L. E., Woolley, M. E., Karabenick, S. A., Strutchens, M. E., & Martin, W. G. (2014). Student perceptions of the classroom environment: Relations to motivation and achievement in mathematics. *Learning Environments Research, 17*(2), 287–304.*

Gillet, N., Vallerand, R. J., & Rosnet, E. (2009). Motivational clusters and performance in a real-life setting. *Motivation and Emotion, 33,* 49–62.

Gootee, M. (2014). *Ethnic differences in academic achievement, self-esteem, locus of control, and learning motivation between Filipinos and caucasians* (Unpublished Doctoral dissertation). University of the Rockies.*

Gottschling, J., Spengler, M., Spinath, B., & Spinath, F. M. (2012). The prediction of school achievement from a behavior genetic perspective: Results from the German twin study on Cognitive Ability, Self-Reported Motivation, and School Achievement (CoSMoS). *Personality and Individual Differences, 53*(4), 381–386.*

Guay, F., Chanal, J., Ratelle, C. F., Marsh, H. W., Larose, S., & Boivin, M. (2010a). Intrinsic, identified and controlled types of motivation for school subjects in young elementary school children. *British Journal of Educational Psychology, 80,* 711–735.

Guay, F., Ratelle, C., Larose, S., Vallerand, R. J., & Vitaro, F. (2013). The number of autonomy-supportive relationships: Are more relationships better for motivation, perceived competence, and achievement? *Contemporary Educational Psychology, 38*(4), 375–382.*

Guay, F., Ratelle, C. F., Roy, A., & Litalien, D. (2010). Academic self-concept, autonomous academic motivation, and academic achievement: Mediating and additive effects. *Learning and Individual Differences, 20*(6), 644–653.*

Guo, J., Marsh, H. W., Parker, P. D., Morin, A. J., & Yeung, A. S. (2015). Expectancy-value in mathematics, gender and socioeconomic background as predictors of achievement and aspirations: A multi-cohort study. *Learning and Individual Differences, 37*, 161–168.*

Hadriana, M., & Ismail, M. A. (2013). The relationship between motivations and self-learning and the English language achievement in secondary high school students. *Asian Social Science, 9* (12), 36–43.*

Haimovitz, K., Wormington, S. V., & Corpus, J. H. (2011). Dangerous mindsets: How beliefs about intelligence predict motivational change. *Learning and Individual Differences, 21*(6), 747–752.*

Hamaideh, S. H., & Hamdan-Mansour, A. M. (2014). Psychological, cognitive, and personal variables that predict college academic achievement among health sciences students. *Nurse Education Today, 34*(5), 703–708.*

Hamm, J. M., Perry, R. P., Clifton, R. A., Chipperfield, J. G., & Boese, G. D. (2014). Attributional retraining: A motivation treatment with differential psychosocial and performance benefits for failure prone individuals in competitive achievement settings. *Basic and Applied Social Psychology, 36*(3), 221–237.*

Hayenga, A. O., & Corpus, J. H. (2010). Profiles of intrinsic and extrinsic motivations: A person-centered approach to motivation and achievement in middle school. *Motivation and Emotion, 34*(4), 371–383.*

Hedges, L. V., & Olkin, I. (1985). *Statistical methods for meta-analysis.* New York: New Press.

Henman, K. (2010). *The correlation between academic achievements, self-esteem and motivation of female seventh grade students: A mixed methods approach* (Unpublished Doctoral dissertation). Indiana State University, Terre Haute, Indiana.*

Hensley, L. C. (2014). Reconsidering active procrastination: Relations to motivation and achievement in college anatomy. *Learning and Individual Differences, 36,* 157–164.*

Hintsanen, M., Alatupa, S., Jokela, M., Lipsanen, J., Hintsa, T., & Leino, M. (2012). Associations of temperament traits and mathematics grades in adolescents are dependent on the rater but independent of motivation and cognitive ability. *Learning and Individual Differences, 22*(4), 490–497.*

Ho, A. N., & Guthrie, J. T. (2013). Patterns of association among multiple motivations and aspects of achievement in reading. *Reading Psychology, 34*(2), 101–147.*

Hood, M., Creed, P. A., & Neumann, D. L. (2012). Using the expectancy value model of motivation to understand the relationship between student attitudes and achievement in statistics. *Statistics Education Research Journal, 11*(2), 72–85.*

Hornstra, L., van der Veen, I., Peetsma, T., & Volman, M. (2013). Developments in motivation and achievement during primary school: A longitudinal study on group-specific differences. *Learning and Individual Differences, 23,* 195–204.*

Horzum, M. B., Önder, İ., & Beşoluk, Ş. (2014). Chronotype and academic achievement among online learning students. *Learning and Individual Differences, 30*, 106–111.*

Hughes, J. N., Im, M. H., & Wehrly, S. E. (2014). Effect of peer nominations of teacher–student support at individual and classroom levels on social and academic outcomes. *Journal of School Psychology, 52*(3), 309–322.*

Johnson, D. W., Johnson, R. T., Roseth, C., & Shin, T. S. (2014). The relationship between motivation and achievement in interdependent situations. *Journal of Applied Social Psychology, 44*(9), 622–633.*

Johnson, R. (2012). *The relationship between parenting style, adolescent motivation and academic achievement: A correlational analysis* (Unpublished Doctoral dissertation). Capella University, Minneapolis.*

Jones, B. D., Paretti, M. C., Hein, S. F., & Knott, T. W. (2010). An analysis of motivation constructs with first-year engineering students: Relationships among expectancies, values, achievement, and career plans. *Journal of Engineering Education, 99*(4), 319–336.*

Joo, Y. J., Joung, S., & Son, H. S. (2014). Structural relationships among effective factors on e-learners' motivation for skill transfer. *Computers in Human Behavior, 32,* 335–342.*

Joo, Y. J., Oh, E., & Kim, S. M. (2015). Motivation, instructional design, flow, and academic achievement at a Korean online university: A structural equation modeling study. *Journal of Computing in Higher Education, 27*(1), 28–46.*

Karagüven, M. H. Ü. (2012). Akademik motivasyon ölçeğinin Türkçe'ye adaptasyonu. *Kuram ve Uygulamada Eğitim Bilimleri, 12*(4), 2599–2620.

Karimi, A., & Saadatmand, Z. (2014). The relationship between self-confidence with achievement based on academic motivation. *Kuwait Chapter of Arabian Journal of Business and Management Review, 4*(1), 210–215.*

Kaya, M. F. (2013). Coğrafya öğrenmeye yönelik motivasyon ölçeği geliştirme çalışması. *Doğu Coğrafya Dergisi, 30,* 155–173.

Khalaila, R. (2015). The relationship between academic self-concept, intrinsic motivation, test anxiety, and academic achievement among nursing students: Mediating and moderating effects. *Nurse Education Today, 35*(3), 432–438.*

Kian, T., Yusoff, W., & Rajah, S. (2014). Motivation for generations' cohorts: An organizational justice perspective. *International Journal of Management Sciences, 11*(2), 536–542.

Kilian, B., Hofer, M., Fries, S., & Kuhnle, C. (2010). The conflict between on-task and off-task actions in the classroom and its consequences for motivation and achievement. *European Journal of Psychology of Education, 25*(1), 67–85.*

King, R. B., & Ganotice, F. A., Jr. (2014). The social underpinnings of motivation and achievement: Investigating the role of parents, teachers, and peers on academic outcomes. *The Asia-Pacific Education Researcher, 23*(3), 745–756.*

Klauda, S. L., & Guthrie, J. T. (2015). Comparing relations of motivation, engagement, and achievement among struggling and advanced adolescent readers. *Reading and Writing, 28*(2), 239–269.*

Klautke, H. (2015). *Online cooperative learning: Effects of descriptive norms and cooperative partner messages on engagement, motivation, and achievement* (Unpublished Doctoral Dissertations). Michigan State University, East Lansing, Michigan, United States.*

Kreishan, L. J., & Al-Dhaimat, Y. (2013). Intrinsic and extrinsic motivation, orientation and achievements in L2 of Arab learners of English, French and German: A study from Jordan. *International Education Studies, 6*(12), 52.*

Kriegbaum, K., Jansen, M., & Spinath, B. (2015). Motivation: A predictor of PISA's mathematical competence beyond intelligence and prior test achievement. *Learning and Individual Differences, 43,* 140–148.*

Kulinskaya, E., Morgenthaler, S., & Staudte, R. G. (2008). *Meta-analysis: A guide to calibrating and combining statistical evidence.* New York: Wiley.

Küçüközkan, Y. (2015). Liderlik ve motivasyon teorileri: Kuramsal bir çerçeve. *Uluslararası Akademik Yönetim Bilimleri Dergisi, 1*(2), 86–115.

Lasagabaster, D. (2011). English achievement and student motivation in CLIL and EFL settings. *Innovation in Language Learning and Teaching, 5*(1), 3–18.*

Lauermann, F., & Karabenick, S. A. (2013). The meaning and measure of teachers' sense of responsibility for educational outcomes. *Teaching and Teacher Education, 30,* 13–26.*

Lazarides, R., & Watt, H. M. (2015). Girls' and boys' perceived mathematics teacher beliefs, classroom learning environments and mathematical career intentions. *Contemporary Educational Psychology, 41,* 51–61.*

Lee, I. C. (2010). The effect of learning motivation, total quality teaching and peer-assisted learning on study achievement: Empirical analysis from vocational universities or colleges' students in Taiwan. *The Journal of Human Resource and Adult Learning, 6*(2), 56.*

Lee, J., & Stankov, L. (2013). Higher-order structure of noncognitive constructs and prediction of PISA 2003 mathematics achievement. *Learning and Individual Differences, 26*, 119–130.*

Lee, J., & Zentall, S. S. (2015). Reading motivation and later reading achievement for students with reading disabilities and comparison groups (ADHD and typical): A 3-year longitudinal study. *Contemporary Educational Psychology*. doi:10.1016/j.cedpsych.2015.11.001*

Lee, N. C., Krabbendam, L., Dekker, S., Boschloo, A., de Groot, R. H., & Jolles, J. (2012). Academic motivation mediates the influence of temporal discounting on academic achievement during adolescence. *Trends in Neuroscience and Education, 1*(1), 43–48.*

León, J., Núñez, J. L., & Liew, J. (2015). Self-determination and STEM education: Effects of autonomy, motivation, and self-regulated learning on high school math achievement. *Learning and Individual Differences, 43,* 156–163.*

Lepper, M. R., Corpus, J. H., & Iyengar, S. S. (2005). Intrinsic and extrinsic motivational orientations in the classroom: Age differences and academic correlates. *Journal of Educational Psychology, 97*(2), 184–196.

Liao, H. A., Ferdenzi, A. C., & Edlin, M. (2012). Motivation, self-regulated learning efficacy, and academic achievement among international and domestic students at an urban community college: A comparison. *The Community College Enterprise, 18*(2), 9.*

Lin, L. C. (2012). Measuring adult learners' foreign language anxiety, motivational factors, and achievement expectations: A comparative study between Chinese as a second-language students and English as a second language students (Unpublished Doctoral Dissertation). Cleveland State University.

Liou, P. Y. (2010). *Cross-National comparisons of the association between student motivation for learning Mathematics and achievement linked with school contexts: Results from TIMSS 2007* (Unpublished Doctoral dissertation). University of Minnesota, Minneapolis.*

Liu, E. Z. F., & Lin, C. H. (2010). The survey study of mathematics motivated strategies for learning questionnaire (MMSLQ) for grade 10–12 Taiwanese students. *The Turkish Online Educational Sciences: Theory and Practice, 9*(2), 221–233.

Liu, W. C., Wang, C. K., & Ryan, R. M. (2016). Understanding motivation in education: Theoretical and practical considerations. In *Building autonomous learners.* Singapore: Springer.

Lüftenegger, M., Kollmayer, M., Bergsmann, E., Jöstl, G., Spiel, C., & Schober, B. (2015). Mathematically gifted students and high achievement: The role of motivation and classroom structure. *High Ability Studies, 26*(2), 227–243.*

Makri-Botsari, E. (2015). Adolescents' unconditional acceptance by parents and teachers and educational outcomes: A structural model of gender differences. *Journal of Adolescence, 43*, 50–62.*

McClure, J., Meyer, L. H., Garisch, J., Fischer, R., Weir, K. F., & Walkey, F. H. (2011). Students' attributions for their best and worst marks: Do they relate to achievement? *Contemporary Educational Psychology, 36*(2), 71–81.*

McCoy, W. (2014). *Transition to middle school: Academic achievement influenced by students perception of self-efficacy, motivation, peer relationships, student-teacher relationships, and parental influences* (Unpublished Doctoral dissertation). California State University, Fullerton.*

McKenzie, K., & Schweitzer, R. (2001). Who succeeds at University? Factors predicting academic performance in first year Australian university students. *Higher Education Research and Development, 20,* 21–32.

Meece, J. L., & Holt, K. (1993). A pattern analysis of students' achievement goals. *Journal of Educational Psychology, 85*(4), 582–590.

Meier, E., Vogl, K., & Preckel, F. (2014). Motivational characteristics of students in gifted classes: The pivotal role of need for cognition. *Learning and Individual Differences, 33,* 39–46.*

Middleton, J. A. (2013). More than motivation the combined effects of critical motivational variables on middle school mathematics achievement. *Middle Grades Research Journal, 8*(1), 77–95.*

Miller, S. D. (2012). *The effect of interactive television as an instruction delivery method in rural secondary schools on learner achievement, motivation and anxiety* (Unpublished Doctoral dissertation). Nova Southeastern University, Florida, USA.*

Mucherah, W., & Herendeen, A. (2013). Motivation for reading and upper primary school students' academic achievement in reading in Kenya. *Reading Psychology, 34*(6), 569–593.*

Must, O., & Täht, K. (2010). Are the links between academic achievement and learning motivation similar in five neighbouring countries? *Trames, 3*, 271–281.*

Núñez-Peña, M. I., Suárez-Pellicioni, M., & Bono, R. (2013). Effects of math anxiety on student success in higher education. *International Journal of Educational Research, 58,* 36–43.*

Olić, S., Adamov, J., & Babić-Kekez, S. (2014). Motivation as a predictor of pupil's achievement in chemistry. *Istraživanja u pedagogiji, 4*(2), 24–36.*

Othman, N., & Leng, K. B. (2011). The relationship between self-concept, intrinsic motivation, self-determination and academic achievement among Chinese primary school students. *International Journal of Psychological Studies, 3*(1), 90.*

Ozel, M., Caglak, S., & Erdogan, M. (2013). Are affective factors a good predictor of science achievement? Examining the role of affective factors based on PISA 2006. *Learning and Individual Differences, 24,* 73–82.*

Önder, İ., Beşoluk, Ş., İskender, M., Masal, E., & Demirhan, E. (2014). Circadian preferences, sleep quality and sleep patterns, personality, academic motivation and academic achievement of university students. *Learning and Individual Differences, 32*, 184–192.*

Paige, D. D. (2011). Engaging struggling adolescent readers through situational interest: A model proposing the relationships among extrinsic motivation, oral reading proficiency, comprehension, and academic achievement. *Reading Psychology, 32*(5), 395–425.*

Passini, S., Molinari, L., & Speltini, G. (2015). A validation of the questionnaire on teacher interaction in Italian secondary school students: The effect of positive relations on motivation and academic achievement. *Social Psychology of Education, 18*(3), 547–559.*

Pedescleaux, J. (2010). *Motivation factors as indicators of academic achievement: A comparative study of student-athletes and non-athletes academic and social motivation* (Unpublished Doctoral dissertation). University of Northern Iowa, United States.*

Perks, K. (2010). *Moving beyond time and choice: Challenge, motivation and achievement during independent reading in high school* (Unpublished Doctoral dissertation). University of New Hampshire, New Hampshire, USA.*

Peklaj, C., Kalin, J., Pecjak, S., Zuljan, M. V., & Levpuscek, M. P. (2012). Perceptions of teachers' goals in classroom, students' motivation and their maladaptive behavior as predictors of high school math achievement. *Studia Psychologica, 54*(4), 329.*

Peterson, E. S. (2015). *Investigating the relationship between elementary students' motivation to read and academic achievement in reading* (Unpublished Doctoral dissertation). University of North Dakota, North Dakota.*

Pintrich, P. R. (2003). A motivational science perspective on the role of student motivation in learning and teaching contexts. *Journal of Educational Psychology, 95*(4), 667–686.

Pintrich, P. R., & Schunk, D. H. (2002). *Motivation in education: Theory, research, and applications* (2nd Ed.). Columbus, Ohio: Merrill Prentice Hall.

Ploeg, A. H. (2015). A self-determination theory model investigating the relationship between high school male student-athlete motivation and academic achievement (Unpublished Doctoral Dissertation). Liberty University.*

Putwain, D. W., Kearsley, R., & Symes, W. (2012). Do creativity self-beliefs predict literacy achievement and motivation? *Learning and Individual Differences, 22*(3), 370–374.*

Raineri, G. M. (2010). *Differences in motivation, self-evaluation, and academic achievement for African American and Caucasian students using structural equation modeling* (Unpublished Doctoral dissertation). The University of Alabama, Tuscaloosa, Alabama.*

Reeve, J. (2014). *Understanding motivation and emotion*. New York, United States of America: Wiley.

Retelsdorf, J., Köller, O., & Möller, J. (2014). Reading achievement and reading self-concept—Testing the reciprocal effects model. *Learning and Instruction, 29*, 21–30.*

Richardson, M., Abraham, C., & Bond, R. (2012). Psychological correlates of university students' academic performance: A systematic review and meta-analysis. *Psychological Bulletin, 138*, 353–387.

Ricks, E. D. (2012). *Cultivating early STEM learners: An analysis of mastery classroom instructional practices, motivation, and mathematics achievement in young children* (Unpublished Doctoral dissertation). Howard University, Washington, D.C.*

Roan-Belle, C. R. (2013). Examining the influence of parents, teachers, and neighborhood safety on African American adolescents' motivation and achievement (Unpublished Doctoral Dissertation). University of Kentucky, Lexington, Kentucky.*

Rosário, P., Núñez, J. C., Valle, A., González-Pienda, J., & Lourenço, A. (2013). Grade level, study time, and grade retention and their effects on motivation, self-regulated learning strategies, and mathematics achievement: A structural equation model. *European Journal of Psychology of Education, 28*(4), 1311–1331.*

Safavian, N. S. (2013). *Examining the impact of mathematics motivation on achievement and course-taking behaviors of low-income Hispanic and Asian immigrant youth* (Unpublished Doctoral dissertation). University of California, Irvine.*

Sankaran, S., & Bui, T. (2001). Impact of learning strategies and motivation on performance: A study in web-based instruction. *Journal of Instructional Psychology, 28*(3), 191–198.

Seiler, S., Lent, B., Pinkowska, M., & Pinazza, M. (2012). An integrated model of factors influencing project managers' motivation—Findings from a Swiss survey. *International Journal of Project Management, 30*(1), 60–72.

Simzar, R. M., Martinez, M., Rutherford, T., Domina, T., & Conley, A. M. (2015). Raising the stakes: How students' motivation for mathematics associates with high-and low-stakes test achievement. *Learning and Individual Differences, 39*, 49–63.*

Skaalvik, E. M., Federici, R. A., & Klassen, R. M. (2015). Mathematics achievement and self-efficacy: Relations with motivation for mathematics. *International Journal of Educational Research, 72*, 129–136.*

Soodmand Afshar, H., Rahimi, A., & Rahimi, M. (2014). Instrumental motivation, critical thinking, autonomy and academic achievement of Iranian EFL learners. *Issues in Educational Research, 24*(3), 281–298.*

Spinath, B., Freudenthaler, H. H., & Neubauer, A. C. (2010). Domain-specific school achievement in boys and girls as predicted by intelligence, personality and motivation. *Personality and Individual Differences, 48*(4), 481–486.*

Su, C.-H., & Cheng, C.-H. (2015). A mobile gamification learning system for improving the learning motivation and achievements. *Journal of Computer Assisted Learning, 31,* 268–286.*

Su, J.-H. (2012). *11th grade students' English reading motivation, language problems and reading achievement in Taiwan* (Unpublished Doctoral dissertation). Texas A&M University, College Station, Texas, United States.*

Supriadi, E., & Yusof, H. A. R. B. M. (2015). Relationship between Instructional Leadership of Headmaster and Work Discipline and Work Motivation and Academic Achievement in Primary School at Special Areas of Central Jakarta. *Journal of Education and Learning, 4*(3), 123.*

Szymanski, A. M. K. (2011). *Pathways toward progress: Examining the relationships among racial identity, academic intrinsic motivation, and perceived support on African American students' academic achievement* (Unpublished Doctoral dissertation). University of Iowa, Iowa City, Iowa.*

Şen, M. (2006). *Effects of English lessons, based on multiple intelligence theory, on students' motivation, self-efficacy, self-esteem and multiple intelligences* (Unpublished Master dissertation). Ankara University, Ankara.

Tahiroğlu, M., & Aktepe, V. (2015). Validity and reliability study on the motivation scale form designed for 4th and 5th grade social studies course. *International Periodical for the Languages, Literature and History of Turkish or Turkic, 10*(3), 907–932.

Taylor, E. (2014). *Race achievement gap: How motivation orientation, school climate, and academic self-concept predict school achievement* (Unpublished Doctoral dissertation). Northcentral University, Prescott Valley, Arizona.*

Taylor, G. (2012). *The differential effects of academic motivation types on school achievement and persistence* (Unpublished Doctoral dissertation). McGill University, Montréal.*

Taylor, G., Jungert, T., Mageau, G. A., Schattke, K., Dedic, H., Rosenfield, S., et al. (2014). A self-determination theory approach to predicting school achievement over time: The unique role of intrinsic motivation. *Contemporary Educational Psychology, 39*(4), 342–358.*

Tempelaar, D. T., Rienties, B., Giesbers, B., & Gijselaers, W. H. (2015). The pivotal role of effort beliefs in mediating implicit theories of intelligence and achievement goals and academic motivations. *Social Psychology of Education, 18*(1), 101–120.*

Tham Yuen San, S. (2012). *The relationship between autonomy support, intrinsic motivation and academic achievement in the Malaysian classroom* (Unpublished Master dissertation). University of Kansas, Lawrance, Kansas, USA.*

Thompson-Cudjoe, V. D. (2015). *Educational motivation and academic achievement differences among generations of black Caribbean college students* (Unpublished Doctoral dissertation). University of Phoenix, Phoenix, Arizona, United States.*

Turan, Z. (2015). *The evaluation of flipped classroom method and examination of its effects on academic achievement, cognitive load and motivation* (Unpublished Doctoral dissertation). Atatürk University, Erzurum.

Tze, V. M., Daniels, L. M., Klassen, R. M., & Li, J. C. H. (2013). Canadian and Chinese university students' approaches to coping with academic boredom. *Learning and Individual Differences, 23,* 32–43.*

Uwameiye, B. E., & Osho, L. E. (2011). Attitude and motivation as predictors of academic achievement of students in clothing and textiles. *Educational Research and Reviews, 6*(16), 864.*

Ural, M. N. (2009). *The effect of entertaining and motivational properties of educational games to academic achievement and motivation* (Unpublished Doctoral dissertation). Anadolu University, Eskişehir.

Van Soom, C., & Donche, V. (2014). Profiling first-year students in STEM programs based on autonomous motivation and academic self-concept and relationship with academic achievement. *PloS One, 9*(11).*

Wade, D. Q. (2012). *The relationship between reading attitude, self-efficacy, motivation, and the reading achievement of fifth grade african-american males* (Unpublished Doctoral dissertation). Howard University, Washington, D.C., USA.*

Walkey, F. H., McClure, J., Meyer, L. H., & Weir, K. F. (2013). Low expectations equal no expectations: Aspirations, motivation, and achievement in secondary school. *Contemporary Educational Psychology, 38*(4), 306–315.*

Wang, J. (2011). *Untangling the relations among high school students' motivation, achievement and advanced course-taking in mathematics: Using structural equation modeling with complex samples* (Unpublished Doctoral dissertation). University of Houston, Houston, USA.*

Waterman, A. S. (2005). When effort is enjoyed: Two studies of intrinsic motivation for personally salient activities. *Motivation and Emotion, 29*(3), 165–188.

Weber, H. S., Lu, L., Shi, J., & Spinath, F. M. (2013). The roles of cognitive and motivational predictors in explaining school achievement in elementary school. *Learning and Individual Differences, 25,* 85–92.*

Whaley, K. A. (2012). *The relationship between teachers' autonomy support and students' intrinsic motivation and academic achievement in middles grades mathematics: A self-determination theory perspective* (Unpublished Doctoral dissertation). Mercer University, Atlanta, GA.*

Wolters, C. A., & Rosenthal, H. (2000). The relation between students' motivational beliefs and their use of motivational regulation strategies. *International Journal of Educational Research, 33*(7), 801–820.

Wormington, S. V., Corpus, J. H., & Anderson, K. G. (2012). A person-centered investigation of academic motivation and its correlates in high school. *Learning and Individual Differences, 22*(4), 429–438.*

Wu, P. L., Hsiao, H. C., Wu, W. H., Lin, C. H., & Huang, S. H. (2010). A survey of technical and vocational students' motivation, style and achievement in information technology and society courses. *International Journal of Learning, 17*(8). 382–395.*

Wurf, G., & Croft-Piggin, L. (2015). Predicting the academic achievement of first-year, pre-service teachers: the role of engagement, motivation, ATAR, and emotional intelligence. *Asia-Pacific Journal of Teacher Education, 43*(1), 75–91.*

Yazdani, K., & Godbole, V. S. (2014). Studying the role of habits and achievement motivation in improving students' academic performance. *European Online Journal of Natural and Social Sciences, 3*(4), 827.*

Yazıcı, H., & Altun, F. (2013). The association between university students' internal and external motivation sources and their academic achievement. *International Journal of Social Science, 6* (6), 1241–1252.

Yıldırım, S. (2011). Self-efficacy, intrinsic motivation, anxiety and mathematics achievement: Findings from Turkey, Japan and Finland. *Necatibey Faculty of Education Electronic Journal of Science and Mathematics Education, 5*(1), 277–291.*

Yıldırım, S. (2012). Teacher support, motivation, learning strategy use, and achievement: A multilevel mediation model. *The Journal of Experimental Education, 80*(2), 150–172.*

Zee, M., Koomen, H. M., & Van der Veen, I. (2013). Student–teacher relationship quality and academic adjustment in upper elementary school: The role of student personality. *Journal of School Psychology, 51*(4), 517–533.*

Zheng, D. (2014). An empirical study on correlation of learners' motivations for content-based bilingual learning with their achievements. *Theory and Practice in Language Studies, 4*(10), 2076–2081.*

Zhu, Y., & Leung, F. K. S. (2010). Motivation and achievement: Is there an east Asian model? *International Journal of Science and Mathematics Education (2011), 9*, 1189–1212.*

Zimmerman, B. J., Bandura, A., & Martinez-Pons, M. (1992). Self-motivation for academic attainment: The role of self-efficacy beliefs and personal goal setting. *American Educational Research Journal, 29*(3), 663–676.

Chapter 4
The Effect of Attitude on Student Achievement

Nihan Sölpük

4.1 Introduction

Attitude is a distinctive concept in social psychology and plays an important role in identifying the characteristics of individuals. Attitude is generally defined as an individual's tendency to react positively or negatively towards a stimulus. In other words, it refers to the tendency of an individual to have positive or negative reactions to certain stimuli (Fishbein and Ajzen 1977). Allport (1935) defines attitude as follows: "… mental and neural state of readiness, organized through experience, exerting a directive influence upon the individual's response to all objects and situations with which it is related" (p. 798). In another definition, attitude is seen as the accumulation of knowledge of an individual about an issue, another individual, a situation and an experience. In addition, attitude is believed to emerge from the beliefs, feelings and intended behaviors of an individual (Simpson et al. 1994).

Attitude is not a trait given at birth; in fact, it is acquired later on. Above all, attitude belongs to human himself. However; it is not a directly observable trait; rather it emerges indirectly from other observable behaviors of individuals. Attitudes mainly develop at early childhood and are shaped by the influences of parents and peers. It is inevitable that life experiences, cultural roots and social interactions influence attitudes. Other distinct attitudes are highly likely to be retained in individuals' memories and affect their behaviors (Aronson 1999).

According to Petty et al. (2003), attitudes develop during socialization depending on individuals' personal knowledge and experiences. There are three components of attitude:

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- Affective: feelings and emotions towards an object
- Cognitive: beliefs and knowledge
- Behavior: tendency to act, intentions and behavioral expectations.

As mentioned in the previous studies, these components are closely interrelated. For instance, "if a person's attitude is supported by favorable cognitive content, then it is likely to be supported by favorable affective and behavioral tendencies" (Petty et al. 2003, p. 754).

Attitudes and behaviors can be analyzed through certain scales used in studies. It is possible to collect data by using certain scales to identify personal traits of an individual. In addition, attitude is directly related to the following issues: the confidence of individuals in their scientific abilities, his interests and his present and future career goals (Mantzicopoulos and Samarapungavan 2008).

Attitude develops towards an event or an object; in other words, a psychological object is necessary for this development. Anything that has a meaning for an individual is an object. Today, the most popular social psychology related objects studied in terms of attitude are politics, religion and racial discrimination. In fact, anything that is related to human beings is related to the concept of attitude. In 1960s Wallace Lambert and Richard Gardner conducted a study in which they studied the factors affecting academic achievement and specifically examined the effects of attitude and motivation. In this comprehensive study, which was carried out in Montreal, Connecticut and Philippines, they did not agree with the idea that attitude and language aptitude are the most important factors affecting success in foreign language learning (Gardner and Lambert 1972).

Villegas and Lucas (2002) explain the effect of teacher attitude on academic achievement as follows: "Teacher attitudes toward students significantly shape what students learn" (p. 24). The author has the following opinion regarding learning: "All students can learn, regardless of home life, socioeconomic status, race, culture, language, gender, ability or any other characteristic" (Kenkel et al. 2006, p. 35).

Attitudes refer to behaviors at different intensities that manage the direct effects of reactions of individuals towards and object (Fishbein and Ajzen 1977). Moreover, Fazio (1990) suggests that strong attitudes are more resistant to change than weak attitudes. This situation is consistent with the idea that strong attitudes are more closely related to personal traits (Petty and Krosnick 1995). Thus, attitudes are significant since they affect classroom practices and are developed by teacher himself. It was found that case studies are important factors leading to the development of attitude towards teaching (e.g., Hudson and Buckley 2004; Struck and Teasdale 2008). Students also reported that these case studies support both self-confidence and the acquisition of important skills. The most important factor affecting the success of case studies is teamwork since it provides an opportunity for students to share knowledge while working together (Hudson and Buckley 2004).

Attitudes are used to determine the rules regarding the world and the reactions to the world (Sapsford 1999). Teachers' understandings of the world and their reactions to the world can be observed in the classroom environment: "Teacher attitudes toward their students significantly shape the expectations teachers hold for student learning, their treatment of students and what students ultimately learn" (Pang and Sablan 1998, p. 42). The attitudes of teachers towards their students affect students' achievement positively (Nieto 2005).

In another study focusing on learning outcomes and classroom learning environment, the attitudes of students towards science achievement and general achievement were examined. The results of many studies on students' achievement and attitudes conflict with each other. At this point, it is necessary to interpret the results of these studies rather than to conduct new ones. One of the methods to achieve this purpose is meta-analysis, which is likely to enable researchers to make generalizations by examining the previous studies available in the related literature (Hunter and Schmidt 2004).

Under the light of the above mentioned issues, the following question emerges and the answer to this question is searched accordingly: What kind of results can be achieved when the findings of studies compared in terms of the attitudes and achievement of students are combined in a common platform?

This study also examines the effects of attitude on students' academic achievement. The following variables, which might have a considerable effect on the results of the current study, were determined as moderators: publication year, publication type, the country (culture) where studies are conducted, the course where achievement is measured and education (primary, high school or higher education). All these variables, along with the results of previous studies, were used to test the following hypotheses of this study:

$\mathbf{H_1}$ Attitude has a positive effect on student achievement.
$\mathbf{H_2}$ Publication year is a moderator for the positive effect of attitude on student achievement.
$\mathbf{H_3}$ Publication type is a moderator for the positive effect of attitude on student achievement.
$\mathbf{H_4}$ The country (culture) where studies are conducted is a moderator for the positive effect of attitude on student achievement.
$\mathbf{H_5}$ The course where achievement is measured is a moderator for the positive effect of attitude on student achievement.
$\mathbf{H_6}$ The education (primary, high school or higher education) is a moderator for the positive effect of attitude on student achievement.

4.2 Method

4.2.1 Study Design

In this study, the effect of attitude on student achievement was tested with a meta-analysis design.

4.2.2 Review Strategy and Criteria for Inclusion/Exclusion

To determine the research studies to include in the meta-analysis, the ScienceDirect, Proquest and Ebsco academic databases were used to conduct a literature review. For this process, the terms attitude and student achievement/student success included in the titles of the studies were used to screen the research studies. The end date for the research studies included in the research was identified as January 2016. Doctoral dissertations and peer-reviewed journals were included in the study.

Many strategies were used to identify the research studies that were appropriate for the meta-analysis of the study. First, a research study pool (760 research studies) was established; it included all studies with attitude and student achievement/success in their titles. The abstracts of these studies were reviewed, and all were found to be appropriate to include in the study. In the second stage, all research studies in the pool were examined in detail. The results of the examination found that 90 of the research studies in the pool were appropriate, and 670 were not found to be suitable. The descriptive statistics of the 90-research studies included in the analysis are presented in Table 4.1. In this section, we included the names of the countries. Therefore, we have to classify them, ideology, or social outlook that emphasizes the significance of groups, for this vertical collectivist (Asia, South America, Africa, etc.) and horizontal collectivist individualist cultures (USA, Canada, Europe, Australia and Israel) will encode the culture.

The criteria for inclusion of the research studies in the analysis study were identified as follows:

- To have the statistical information necessary for correlational meta-analysis (n and r, or R^2 values)
- To be a study measuring the correlation attitude and student achievement/ success
- Reasons for not including a research study in the meta-analysis:
- Having no quantitative data (qualitative research)
- Not having a correlation coefficient
- Not focusing on student achievement
- Not focusing on attitude.

4.2.3 Coding Process

The coding process was essentially a data sorting process used to as certain which data were clear and suitable for the study. In this scope, a coding form was developed before the statistical analysis was conducted, and the coding was conducted according to the form. The main aim was to develop a specific coding system that allowed the study to see the entirety of the research studies in general

Table 4.1 Characteristics of the studies included in the meta-analysis

	n	%
The years of the studies		
2016–2011	68	75.6
2010–2005	22	24.4
Type of publication		
Dissertation	29	32.2
Article	61	67.8
The Country (culture)		
Vertical collectivist	40	44.4
Horizontal collectivist	50	55.6
The course		
Gymnastics	1	1.1
Computer	2	2.2
Biology	1	1.1
Science	11	12.2
Overall success	30	33.3
English	9	10
Chemistry	4	4.4
Mathematics	15	16.7
Reading skills	9	10
Foreign language	3	3.3
Writing	5	5.6
The education		
Primary school	28	31.1
Secondary school	19	21.1
Secondary and high school	3	3.3
High school	24	26.7
University	16	17.8

and that would not miss any characteristics of each individual research study. The coding form developed in the study was comprised of:

- References for the research
- Sample information
- Sample group
- Publication year,
- Type of publication,
- Type of course
- The education (primary, high school or higher education),
- Data collection tool(s)
- Quantitative values.

4.2.4 Statistical Processes

The effect size acquired in meta-analysis is a standard measure value used in the determination of the strength and direction of the relationship in the study. Pearson's correlation coefficient (r) was determined to be the effect size in this study. Because the correlation coefficient has a value between +1 and −1, the r-value calculated was evaluated by converting this value into the value as it appears in the z table. Provided that more than one correlation value is given between the same structure categories in correlational meta-analysis studies, two different approaches are used in the determination of the one to be used in the meta-analysis. For this study, (*i*) first, if the correlations were independent, all the related correlations were included in the analysis and were considered to be independent studies, and (*ii*) if there were dependent correlations, then the highest correlation value was accepted. A random effect model was used for the meta-analysis processes in this study. The Comprehensive Meta-Analysis program was used in the meta-analysis process.

4.2.5 Moderator Variables

To determine the statistical significance of the differences between the moderators of the study, only the Qb values were used. Four moderator variables that were expected to have a role in the average effect size were identified in the study. The first of these considered is the type of publication as a moderator in regards to the relationship between attitude and student achievement. The second is the sample group, which was thought to have a role on the average impact of attitude on student achievement. The rest are the school subject/assessment type, data collection tools, years of the studies, country, and sub dimensions of attitude.

4.2.6 Publication Bias

A funnel plot for the research studies included in the meta-analysis of can be seen in Fig. 4.1. Evidence that publication bias affected the research studies included in the meta-analysis can be seen in Fig. 4.1. A serious asymmetry would be expected in the funnel plot if there were a publication bias. The concentration of plots on one side under the line of average effect size, particularly in the bottom section of the funnel, suggests the probability of a publication bias in the research studies. In this study, no evidence of partiality of the publications was observed in any of the 90 data subjected to meta-analysis.

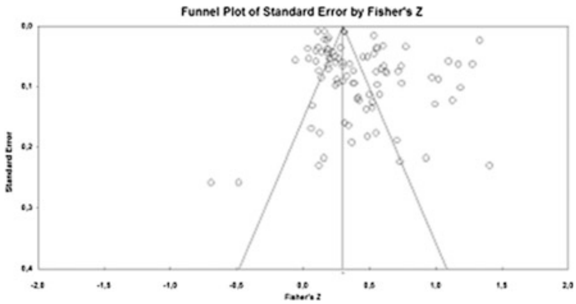

Fig. 4.1 Effect size funnel for publication bias

Table 4.2 Duval and Tweedie's trim and fill test results

	Excluded studies	Point estimate	*CI* (Confidence interval)		*Q*
			Lower limit	Upper limit	
Observed values		0.40	0.35	0.45	4737.9
Corrected values	15	0.46	0.41	0.51	9414.4

Although no partiality in publications was observed in the funnel plot, the results of Duval and Tweedie's trim and fill test, which was applied to determine the effect of partiality in publications acquired with the meta-analysis using the random effect model, are given in Table 4.2. As is seen in Table 4.2, there is no difference between the effect observed and the artificial effect size created to fix the effect of the partiality of publications. The research on each side of the centerline is symmetrical, and this is the indicator of non-difference. Because there is no evidence indicating lost data on either side of the centerline, the difference between the fixed effect size and observed effect size is zero.

4.3 Findings

Table 4.3 displays the results of meta-analysis on the relationship between attitude and academic achievement. The findings supported H_1, which states that attitude has a positive effect on academic achievement and this effect was calculated as 0.40. This value shows that attitude has a medium level effect on student achievement (see Cohen 1988).

The findings also supported H_2 hypothesis, which states that publication year is a moderator in the positive effect of attitude on academic achievement. The moderator analysis found a statistically significant and effect level difference among

Table 4.3 Correlation between the findings of attitude and student achievement: Meta-analysis results

Variable	*k*	*N*	*r*	*CI* (Confidence interval)		*Q*	*Qb*
				Lower limit	Upper limit		
Attitude	90	78015	.40*	.35	.45	4737.956*	
Moderator [Publication type]							9.851*
Article	61	60493	.44*	.38	.50		
Dissertation	29	17522	.31*	.25	.36		
Moderator [publication year]							14,288*
2005–2010	22	7618	.57*	.47	.65		
2011–2016	68	70397	.34*	.29	.39		
Moderator [The country]							3.349
Vertical collectivist	40	16349	.46*	.35	.55		
Horizontal collectivist	50	61666	.35*	.31	.39		
Moderator [The course]							146,867*
Gymnastics	1	299	.80*	.76	.84		
Computer	2	372	.15	−.15	.43		
Biology	1	180	.62*	.52	.70		
Science	11	17528	.36*	.21	.49		
Overall success	30	8771	.38*	.30	.45		
English	9	13712	.49*	.20	.71		
Chemistry	4	2821	.24*	.13	.36		
Mathematics	15	17123	.42*	.34	.50		
Reading skills	9	13945	.36*	.12	.56		
Foreign language	3	719	.18	−.23	.53		
Writing	5	2545	.50*	.27	.67		
Moderator [The education]							16.547*
Primary	28	10077	.39*	.32	.45		
Secondary	19	5838	.43*	.32	.53		
Secondary and high	3	3450	.18*	.08	.28		
High	24	53071	.33*	.27	.39		
University	16	5579	.51*	.25	.70		

$^*p < .05$

publication years (Qb = 14,288, $p > 0.05$). While the effect of attitude on academic achievement was a high level effect between 2005 and 2009 [$r = 0.57$] this effect became a medium level effect after 2010 [$r = 0.34$].

The findings also supported H_3 hypothesis, which states that publication type is a moderator in the positive effect of attitude on academic achievement. The moderator analysis found a statistically significant and effect difference among publication types ($Qb = 9.851$, $p > 0.05$). While the effect of attitude on academic achievement was at a medium-level for articles [$r = 0.44$] it was a low level effect for dissertations [$r = 0.31$].

The findings do not support H_4 hypothesis, which states that the country (culture) where studies are conducted is a moderator in the positive effect of attitude on academic achievement.

The findings supported H_5 hypothesis, which states that the course where achievement is measured is a moderator in the positive effect of attitude on academic achievement. In the studies included in the meta-analysis, the effects of attitude on academic achievement were found to have a moderately significant effect on the following courses: for physical education [$r = 0.80$] and biology [$r = 0.62$] attitude had a large effect on student achievement, whereas for science [$r = 0.36$], general achievement [$r = 0.38$] and chemistry [$r = 0.24$] attitude had a low level effect on student achievement. Finally, attitude had a medium level effect on student achievement for English [$r = 0.49$], mathematics [$r = 0.42$] and reading skills [$r = 0.36$].

Finally, the findings supported H_6 hypothesis, which states that the level of education (primary, high school or higher education) is a moderator in the positive effect of attitude on academic achievement. In the studies included in meta-analysis, the effects of attitude on academic achievement were as follows: high-level effect on academic achievement at universities [$r = 0.51$]; low level effect on academic achievement at high school [$r = 0.18$]; medium level effect on academic achievement at primary education [$r = 0.39$]; medium level effect on academic achievement at secondary school [$r = 0.43$]; and medium level effect on academic achievement at secondary school and high school [$r = 0.33$]. In the moderator analysis, the effect difference of attitude on academic achievement among different sampling groups was found to be statistically significant ($Qb = 16.547$, $p < 0.05$).

4.4 Conclusion

This meta-analysis study was carried out to test the effect of attitude on academic achievement. The relationship between attitude and academic achievement was examined in 90 studies having a total of 78.015 students as sampling. According to this study, attitude moderately affects academic achievement. Educational researchers emphasize the fact that the attitudes of students towards a topic lead to academic achievement (Acun 2014; Baker and Digiovanni 2005; Tezer and Karasel 2010). Self-confidence is directly related to achievement at mathematics (Hannula 2012).

A large number of studies examined the attitudes of students towards mathematics and these attitudes were treated as both desired and undesired learning outcomes. Additional studies have found a relationship between attitudes and mathematics (Wong and Chen 2012). The negative attitude towards mathematics and performance is a two-way relationship. Mutodi and Ngirande (2014) found strong statistical evidence for the fact that negative attitude towards mathematics is affected by the general difficulty of the topic, students' lack of knowledge and difficulties experienced.

To determine the relationship between attitude and academic achievement has been an important concern in social psychology and educational sciences. Further comprehensive studies focusing on these topics will produce more knowledge about individuals' attitudes. The future studies on the topic should focus on the following issues so that they can considerably contribute to the field.

The number of studies in secondary and higher education institutions is relatively low. Therefore, more studies can be conducted to explore the effects of attitude on academic achievement more effectively.

It was found that the studies in the literature mostly focused on general academic achievement, and certain courses such as biology and chemistry are ignored to a great extent. Therefore, more studies can be carried out about the effects of attitude on academic achievement in these courses.

This study examined the effect of attitude on academic achievement and the level of education was found to be a moderator variable. Tomlinson (2005) emphasizes the importance of students' attitude towards learning for achievement. The results of attitude studies conducted with secondary school students showed that the effective participation in classroom activities increases skill development (Shen and Chen 2007; Subramaniam and Silverman 2007; Gao et al. 2009).

This meta-analysis used a random effect model and the results showed that attitude has a moderate positive effect on academic achievement. Ma and Kishor's (1997) meta-analysis study examined the relationship between students' attitude towards mathematics and mathematics achievement in 113 studies with a total of 82.941 students. The results revealed a small positive cause-effect relationship. Luke and Sinclair (1991) suggest that teachers affect students' attitude and the positive or negative development of attitude are directly related to the educator.

This study tested the effect of students' attitude on academic achievement, and the predetermined courses where achievement is measured were found to be a moderator variable. Ma and Xu (2004) examined the order of the cause-effect relationship between attitude towards mathematics and academic achievement. According to their results, developing an attitude first and later reaching achievement and vice versa were found both to be meaningful. Hammouri (2004) examined the attitude of 3000 Jordanian students and their achievement on mathematics. According to the results, attitude towards mathematics and self-confidence predicts mathematics achievement. Tymss (2001), however, in his comprehensive study of 21,000 students on the attitude towards mathematics, found academic skills of teachers and students as the most important factors. He also found a weak relationship between attitude and age, gender and language. Finally, the country (culture) where studies are conducted was found not to be a moderator variable.

In sum, the relationship between attitude and student achievement should be established through quantitative research. In this study, the effect of attitude on the student achievement was found to be of a medium level. This finding is important because it shows that attitude behaviors affect student achievement, which is thought to have a critical role for students in reaching their objectives and sustaining their existence in the long term.

References

Note. "*" References marked with an asterisk indicate studies included in the Meta-analysis. The in-text citations to studies selected for Meta-analysis are not followed by asterisks.

Acun, İ. (2014). Web-supported effective human rights, democracy and citizenship education? *Computers & Education, 70,* 21–28.

Adler, K. B. (2011). *Policy appears upon the scene, hand in hand with poverty: An analysis of the moderating effects of teacher attitude on the relationship between professional development and student achievement* (Master's thesis). Available from ProQuest Dissertations and Theses database (UMI No. 1510908)*

Akandere, M., Ozyalvac, N. T., & Duman, S. (2010). The attitudes of the students in secondary education to physical education lesson and the investigation of their success motivations. *Selcuk University Journal of Institute of Social Sciences, 24*, 1–10.*

Akin, A. (2012). Achievement goal orientations and math attitudes. *Studia Psychologica, 54*(3), 237.*

Allegretti, R. M. (2010). *A comparative analysis of traditional versus contract activity packaged-versus tactual instruction on the achievement and attitudes of first year college students with literature in a core university course* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database (UMI No. 3411038)*

Allport, G. W. (1935). Attitudes. In C. Murchinson (Ed.), *A handbook of social psychology* (pp. 798–844). Worcester, MA: Clark University.

Aronson, E. (1999). *The social animal* (8th ed.). New York: Worth Publishers.

Aronson, Z. H., Shenhar, A. J., & Reilly, R. R. (2010). Project spirit: Placing partakers' emotions, attitudes and norms in the context of project vision, artifacts, leader values, contextual performance and success. *The Journal of High Technology Management Research, 21*(1), 2–13.*

Bain, S. K., McCallum, R. S., Bell, S. M., Cochran, J. L., & Sawyer, S. C. (2010). Foreign language learning aptitudes, attitudes, attributions, and achievement of postsecondary students identified as gifted. *Journal of Advanced Academics, 22*(1), 130–156.*

Baker, R., & Digiovanni L. (2005). Narratives on culturally relevant pedagogy: Personal responses to the standardized curriculum. *Current Issues in Education, 8*(22), 1–16. Retrieved from http://cie.asu.edu/volume8/number22/

Bastug, M. (2015). Effects of primary school fourth-grade students' attitude, disposition and writer's block on writing success. *Egitim ve Bilim, 40*(180).*

Beavers, J. E. (2014). *At risk student attitudes toward school as related to achievement, attendance, and behavioral incidents* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database (UMI No. 3647004)*

Bolen, J. A. (2011). *Spatial ability, motivation, and attitude of students as related to science achievement* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database (UMI No. 3486472)*

Bowe, A. G. (2012). *A cross-cultural comparison of predictors of achievement amongst Caribbean students: Attitudes and Behaviors that may explain the achievement gap between girls and boys in the English-speaking Caribbean* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database (UMI No. 3540874)*

Cinkara, E., & Bagceci, B. (2014). Learner's attitudes towards online language learning; and corresponding success rates. *Turkish Online Journal of Distance Education, 14*(2), 6.*

Çelık, H. C. (2015). Effects of computer course on computer self-efficacy, computer attitudes and achievements of young individuals' in Siirt, Turkey. *Educational Research and Reviews, 10* (3), 249.*

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.

Davis, R. L. (2015). *The predictive relationship of middle school teachers' self-efficacy and attitudes toward inclusion and the reading achievement of students with learning disabilities* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database (UMI No. 3687245)*

Dowey, A. L. (2013). *Attitudes, interests, and perceived self-efficacy toward science of middle school minority female students: considerations for their low achievement and participation in STEM disciplines* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database (UMI No. 3596746)*

Elçi, A. N., Kiliç, D. S., Lisesi, M. A., & Alkan, H. (2012). 4MAT Model's impact on the learning styles, success and attitudes towards mathematics. *Journal of Educational and Instructional Studies in the World, 2*(3), 135–147.*

Esmaeili, M. (2013). EFL teachers with different attitudes in one educational system: Will they impact their learners' achievement differently? *European Online Journal of Natural and Social Sciences, 2*(2), 6.*

Fathi, A., Teimori, N., Malekirad, A. A., Azar, E. F., Poorbaghban, H., Mohamadi, K. A., & Shahdosti, L. (2013). Predicting variables of academic achievement and science self-concept of students in third year guidance school based on parents' education level and attitude towards science. *European Online Journal of Natural and Social Sciences, 2*(2), 417.*

Fazio, R. H. (1990). Multiple processes by which attitudes guide behavior. The MODE model as an integrative framework. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (pp. 75–109). San Diego, CA: Academic Press.

Fishbein, M., & Ajzen, I. (1977). Attitude-behavior relations: A theoretical analysis and review of empirical research. *Psychological Bulletin, 84*(5), 888.

Forehand, M. J. (2014). *Working on the work framework for engagement: Impacting students' perceived learning, attitudes toward school, and achievement* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database (UMI No. 3617904)*

Forshey, A. L. (2013). *Effects of reading attitude on reading achievement of students in grades one through six* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database (UMI No. 3561714)*

Fraser, B. J. (1981). *Test of science-related attitudes (TOSRA).* Melbourne, Australia: Australian Council of Educational Research.

Fraser, B. J., Aldridge, J. M., & Adolphe, F. S. G. (2010). A cross-national study of secondary science classroom environments in Australia and Indonesia. *Research Science Education, 40,* 551–571.

Gamble, V. D. (2011). *The impact of differentiated versus traditional instruction on math achievement and student attitudes* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database (UMI No. 3466511)*

Ganley, C. M., & Vasilyeva, M. (2011). Sex differences in the relation between math performance, spatial skills, and attitudes. *Journal of Applied Developmental Psychology, 32*(4), 235–242.*

Gao, Z., Lodewyk, K. R., & Zhang, T. (2009). The role of ability beliefs and incentives in middle school students' intention, cardiovascular fitness, and effort. *Journal of Teaching in Physical Education, 28,* 3–20.

Gardner, R. C., & Lambert, W. E. (1972). *Attitudes and motivation in second-language learning*. USA: Newbury House Publishers.

Gbore, L. O., & Daramola, C. A. (2013). Relative contributions of selected teachers' variables and students' attitudes toward academic achievement in biology among senior secondary schools students in Ondo State, Nigeria. *Current Issues in Education, 16*(1).*

Göçer, A. (2014). The relationship between anxiety and attitude of students learning Turkish as a foreign language and their achievement on target language. *Educational Research and Reviews, 9*(20), 879.*

Guven, B., & Cabakcor, B. O. (2013). Factors influencing mathematical problem-solving achievement of seventh grade Turkish students. *Learning and Individual Differences, 23*, 131–137.*

Hackett Faroul, G. (2010). *Analysis of the factors affecting educational attitudes and academic achievement of minority groups in New York City Schools* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database (UMI No. 3455134)*

Hammouri, H. A. M. (2004). Attitudinal and motivational variables related to mathematics achievement in Jordan: Findings from the third international mathematics and science study (TIMSS). *Educational Research, 46*(3), 241–258. Retrieved from http://search.proquest.com/docview/37995963accountid=14068

Hannula, M. (2012). Exploring new dimensions of mathematics-related affect: embodied and social theories. *Research in Mathematics Education,14*(2), 137–161. doi:10.1080/14794802.2012.694281

Helding, K. A., & Fraser, B. J. (2013). Effectiveness of National Board Certified (NBC) teachers in terms of classroom environment, attitudes and achievement among secondary science students. *Learning Environments Research, 16*(1), 1–21.*

Hemmings, B., Grootenboer, P., & Kay, R. (2011). Predicting mathematics achievement: The influence of prior achievement and attitudes. *International Journal of Science and Mathematics Education, 9*(3), 691–705.*

Hemmings, B., & Kay, R. (2010). Prior achievement, effort, and mathematics attitude as predictors of current achievement. *The Australian Educational Researcher, 37*(2), 41–58.*

Hood, N. R. (2015). *Under which conditions does reading attitude most influence reading achievement? Most influence reading achievement?* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database (UMI No. 3719379)*

Horzum, M. B., Önder, İ., & Beşoluk, Ş. (2014). Chronotype and academic achievement among online learning students. *Learning and Individual Differences, 30*, 106–111.*

Hosseinpour, V., Yazdani, S., & Yarahmadi, M. (2015). The relationship between parents' involvement, attitude, educational background and level of income and their children's english achievement test scores. *Journal of Language Teaching and Research, 6*(6), 1370–1378.*

Hudson, J. N., & Buckley, P. (2004). An evaluation of case-based teaching: Evidence for continuing benefit and realization of aims. *Advances in Physiology Education, 28,* 15–22.

Hunter, J. E., & Schmidt, F. L. (2004). *Methods for meta-analysis: Correcting error and bias in research findings*. Newbury Park, CA: Sage.

Hsu, W. H. (2015). Transitioning to a communication-oriented pedagogy: Taiwanese university freshmen's views on class participation. *Original Research Article System, 49*, 61–72.*

Iovu, M. B., Runcan, P., & Runcan, R. (2015). A Study of the attitudes, self-efficacy, effort and academic achievement of social work students towards research methods and statistics: A diachronic approach. *Revista De Asistenta Sociala*, (1), 103.*

Johnson, J. E. (2011). The influence of keeping score on parents'achievement goals, attitudes about winning, and game behaviors. *Journal of Contemporary Athletics, 5*(2), 105.*

Johnson, R. L. (2011). *The relationship between attitude and academic achievement. among seventh and eighth grade African American Males* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database (UMI No. 3484770)*

Kazazoğlu, S. (2013). Türkçe ve ingilizce derslerine yönelik tutumun akademik başarıya etkisi. *Eğitim ve Bilim, 38*(170).*

Keller, J. M. (2010). The Arcs model of motivational design. In Motivational Design (Ed.), *for Learning and Performance*. US: Springer.
Kenkel, S., Hoelscher, S., & West, T. (2006). Leading adolescents to mastery. *Educational Leadership, 63*(7), 33–37.
Kıngır, S., & Aydemir, N. (2012). An investigation of the relationships among 11th grade students' attitudes toward chemistry, metacognition and chemistry achievement. *Gazi University Journal of Gazi Educational Faculty* (*GUJGEF*)*, 32*(3), 823–842.*
Kirikkaya, E. B., & Vurkaya, G. (2011). The effect of using alternative assessment activities on students' success and attitudes in science and technology course. *Educational Sciences: Theory and Practice, 11*(2), 997–1004.*
Kuo, F. R., Hwang, G. J., & Lee, C. C. (2012). A hybrid approach to promoting students' web-based problem-solving competence and learning attitude. *Computers & Education, 58*(1), 351–364.*
Kurbanoğlu, N. İ. (2013). The effects of organic chemistry anxiety on undergraduate students in relation to chemistry attitude and organic chemistry achievement. *Journal of Baltic Science Education, 12*(2).*
Küçük, S., Yilmaz, R., & Göktas, Y. (2014). Augmented reality for learning English: Achievement, attitude and cognitive load levels of students. *Egitim ve Bilim, 39*(176).*
Lawson, E. R. (2010). *Teacher attitude toward black English and its impact on reading achievement* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database (UMI No. 3445871)*
Liem, G. A. D., & Martin, A. J. (2015). Young people's responses to environmental issues: Exploring the roles of adaptability and personality. *Personality and Individual Differences, 79,* 91–97.*
Lipnevich, A. A., Preckel, F., & Krumm, S. (2016). Mathematics attitudes and their unique contribution to achievement: Going over and above cognitive ability and personality. *Learning and Individual Differences, 47*, 70–79.*
Luke, M., & Sinclair, G. (1991). Gender differences in adolescents' attitudes toward school physical education. *Journal of Teaching in Physical Education, 11,* 31–46.
Ma, X., & Kishor, N. (1997). Assessing the relationship between attitude toward mathematics and achievement in mathematics: A meta-analysis. *Journal for Research in Mathematics Education, 28,* 26–47.
Ma, X., & Xu, J. (2004). Determining the causal ordering between attitude toward mathematics and achievement in mathematics. *American Journal of Education, 110*(3), 256–280. Retrieved from http://search.proquest.com/docview/223995760?accountid=14068
Mantzicopoulos, P., & Samarapungavan, A. (2008). Young children's motivational beliefs about learning science. *Early Childhood Research Quarterly, 23*, 378–394. doi:10.1016/j.ecresq.2008.04.001
McNeal, R. B., Jr. (2014). Parent involvement, academic achievement and the role of student attitudes and behaviors as mediators. *Universal Journal of Educational Research, 2*(8), 564–576.*
Mitchell, S. (1996). Relationships between perceived learning environment and intrinsic motivation in middle school physical education. *Journal of Teaching in Physical Education, 15,* 369–383.
Mohamed, R. J. (2013). *A study of African American male students*' *academic achievement and school attitude in an urban elementary school* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database (UMI No. 3557422)*
Muis, K. R., Ranellucci, J., Trevors, G., & Duffy, M. C. (2015). The effects of technology-mediated immediate feedback on kindergarten students' attitudes, emotions, engagement and learning outcomes during literacy skills development. *Learning and Instruction, 38*, 1–13.*
Mutodi, P., & Ngirande, H. (2014). The influence on students' perceptions on mathematics performance. A case of a selected high school in South Africa. *Mediterranean Journal of Social Sciences, 5*(3), 431–445.

Nasr, A. R., & Soltani, A. K. (2011). Attitude towards biology and its effects on student's achievement. *International Journal of Biology, 3*(4), 100.*

Nieto, S. (Ed.). (2005). *Why we teach*. New York: Teachers College Press.

Ogunniyi, S. O. (2015). Undergraduates' attitude as correlates of academic achievement in cataloguing and classification in library schools in Southern Nigeria. *Library Philosophy and Practice*, 1–14.*

Opateye, J. A. P. (2014). The relationship between emotional intelligence, test anxiety, stress, academic success and attitudes of high school students towards electrochemistry. *Ife Psychologa, 22*(1), 239–249.*

Paker, T., & Erarslan, A. (2015). Attitudes of the preparatory class students towards the writing course and their attitude-success relationship in writing. *Journal of Language and Linguistic Studies, 11*(2), 1–11.*

Pang, V. O., & Sablan, V. A. (1998). Teacher efficacy: How do teachers feel about their abilities to teach African American students? In M. E. Dilworth (Ed.), *Being responsive to cultural differences* (pp. 39–58). Thousand Oaks, CA: Corwin Press.

Peixoto, F. J. B. (2011). "Is it beneficial to stress grades to my child?"—Relationships between parental attitudes towards academic achievement, motivation, academic self-concept and academic achievement in adolescents. *International Journal about Parents in Education, 5*(2), 98–109. *

Perkins, G. (2011). *Impact of STS* (*Context-based type of teaching*) *in comparison with a textbook approach on attitudes and achievement in community college chemistry classrooms* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database (UMI No. 3487025)*

Petty, R., Fabrigar, L., & Wegener, D. (2003). Emotional factors in attitudes and persuasion. In R. Davidson, K. Scherer, & H. Goldsmith (Eds.), *Handbook of affective sciences* (pp. 752–772). Oxford: Oxford University Press.

Petty, R. E., & Krosnick, J. A. (1995). *Attitude strength: Antecedents and consequences*. England: Lawrence Erlbaum Associates Inc.

Phongpila, P. S., Singseewo, A., Boobphapan, A., & Wongjantra, P. (2011). Learning achievement and attitude to environmental conservation, environmental morality and critical thinking of students who study with the circumspective teaching format (Yonisomanasikarn). *Asian Social Science, 7*(5), 158.*

Polat, B., & Doğan, N. (2015). The effects of vee diagrams, concept maps, diagnostic branched tree on attitudes to mathematics course and success. *Eğitimde Kuram ve Uygulama, 11*(3), 851–874.*

Pyzdrowski, L. J., Sun, Y., Curtis, R., Miller, D., Winn, G., & Hensel, R. A. (2013). Readiness and attitudes as indicators for success in college calculus. *International Journal of Science and Mathematics Education, 11*(3), 529–554.*

Robinson, E., & Fraser, B. J. (2013). Kindergarten students' and parents' perceptions of science classroom environments: Achievement and attitudes. *Learning Environments Research, 16*(2), 151–167.*

Ronglien, L. A. (2013). *Gender differences in attitudes toward mathematics gender differences in attitudes toward mathematics and achievement in mathematics* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database (UMI No. 1523839)*

Sapsford, R. (1999). *Survey research*. Thousand Oaks, CA: SAGE.

Sadi, Ö., & Cakiroglu, J. (2011). Effects of hands-on activity enriched instruction on students' achievement and attitudes towards science. *Journal of Baltic Science Education, 10*(2).*

Salame, H. M. (2015). *Using the instructional congruence model to change a science teacher's practices and English language learners' attitudes and achievement in science* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database (UMI No. 3700673)*

Sanders White, P. (2013). *Improving science achievement and attitudes of students with and without learning disabilities* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database (UMI No. 3608811)*

Serin, O., Saracaloğlu, A. S., & Yavuz, G. (2010). The relation among candidate teachers' computer self-efficacies, attitudes towards the Internet and achievements in a computer course. *International Online Journal of Educational Sciences, 2*(3), 666–676.*

Shen, B., & Chen, A. (2007). Examining the interrelations among knowledge, interests, and learning strategies. *Journal of Teaching in Education, 25,* 182–199.

Simpson, R. D., Koballa, T. R., Jr., Oliver, J. S., & Crawley, F. E. (1994). Research on the affective dimensions of science learning. In D. Gabel (Ed.), *Handbook of research on science teaching and learning* (pp. 211–234). New York: Macmillan.

Spencer, M. A. (2012). *Attitudes matter: An examination of the relationship between student attitudes toward mathematics and success in middle school algebra 1.* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database (UMI No. 3541501)*

Stricker, D., Weibel, D., & Wissmath, B. (2011). Efficient learning using a virtual learning environment in a university class. *Computers & Education, 56*(2), 495–504.*

Struck, B. D., & Teasdale, T. A. (2008). Development and evaluation of a longitudinal case-based learning (CBL) experience for a geriatric medicine rotation. *Gerontology and Geriatric Education, 28*(3), 105–114.

Subramaniam, P., & Silverman, S. (2007). Middle school students' attitudes toward physical education. *Teaching and Teacher Education: An International Journal of Research and Studies, 23*(5), 602–614.

Sutanto, E. M., & Eliyana, A. (2014). The study of entrepreneurial characteristics with achievement motivation and attitude as the antecedent variables. *Researchers World, 5*(4), 125–134.*

Taş, E. (2015). The effects of activity and gain based virtual material on student's success, permanency and attitudes towards science lesson. *Journal of Education and Training Studies, 3* (5), 155–164.*

Tezer, M., & Karasel, N. (2010). Attitudes of primary school 2nd and 3rd grade students towards mathematics course. *Procedia Social and Behavioral Sciences, 2,* 5808–5812.

Tilfarlioglu, F. Y., & Delbesoglugil, A. B. Ö. (2014). Questioning academic success through self-regulation, self-esteem and attitude in foreign language learning (a case study). *Theory and Practice in Language Studies, 4*(11), 2223.*

Tomlinson, C. A. (2005). Grading and differentiation: Paradox or good practice? *Theory Into Practice, 44*(3), 262–269.

Tow, T. (2011). *Comparing differences in math achievement and attitudes toward math in a sixth grade mathematics enrichment pilot program* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database (UMI No. 3450356)*

Tymms, P. (2001). A test of the big fish in a little pond hypothesis: An investigation into the feelings of seven year old pupils in school. *School Effectiveness and School Improvement, 12* (2), 161–181.

Uçkun, B., Tohumoğlu, G., & Utar, S. (2011). The relationship between general motivation and situation specific attitudes and beliefs related to learning english for academic purposes: It's impact on academic success. *University of Gaziantep Journal of Social Sciences, 10*(1).*

Uwameiye, B. E., & Osho, L. E. (2011). Attitude and motivation as predictors of academic achievement of students in clothing and textiles. *Educational Research and Reviews, 6*(16), 864.*

Uzun, A. M., Unal, E., & Yamac, A. (2013). Service teachers' academic achievements in online distance education: the roles of online self-regulation and attitudes. *Turkish Online Journal of Distance Education, 14*(2), 131–140.*

Ünal, E., & İşeri, K. (2012). Analysis of the relationship between reading and writing attitudes of teacher candidates and their academic achievements through the structural equation model. *İlköğretim Online, 11*(4).*

Vahdany, F., Sabouri, N. B., & Ghafarnian, S. (2015). The relationship among EFL teachers, students' attitudes & their teaching learning achievements in English. *Theory and Practice in Language Studies, 5*(12), 2625.*

Van der Kleij, F. M., Eggen, T. J., Timmers, C. F., & Veldkamp, B. P. (2012). Effects of feedback in a computer based assessment for learning. *Computers & Education, 58*(1), 263–272.*

Veloo, A., Nor, R., & Khalid, R. (2015). Attitude towards Physics and Additional Mathematics Achievement towards Physics Achievement. *International Education Studies, 8*(3), 35.*

Villegas, A. M., & Lucas, T. (2002). *Educating culturally responsive teachers: A coherent approach*. Albany, NY: State University of New York Press.

Wade, Q. D. (2012). *The relationship between reading attitude, self efficacy, motivation, and the reading achievement of fifth grade African-American males* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database (UMI No. 3513527)*

Ward, S. L. (2013). *An examination of a relationship between reading attitudes and reading achievement for a group of sixth grade students* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database (UMI No. 3558925)*

Watt, K. (2011). *A comparison of the effects of programmed learning sequenced and interactive whiteboard instruction on the mathematics achievement and attitudes of eighth grade students* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database (UMI No. 3476155)*

West, C. L. (2010). *Secondary students' reading attitudes and achievement in a scaffolded silent reading program versus traditional sustained silent reading* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database (UMI No. 3430629)*

Williams, H. M. (2012). *Third grade students' writing attitudes, self efficacy beliefs, and achievement* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database (UMI No. 1529350)*

Wong, K., & Chen, Q. (2012). Nature of an attitudes toward learning mathematics Questionnaire. In J. Dindyal, L. P. Cheng, & S. F. Ng (Eds.), *Mathematics education: Expanding horizons* (pp. 793–800). (Proceedings of the 35th annual conference of the Mathematics Education Research Group of Australasia). Singapore: MERGA.

Wright, J. W. (2011). *Middle school student activity interests and their attitudes toward curriculum, learning environment, and achievement goals in physical education* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database (UMI No. 3459300)*

Yalvaç, B., & Sungur, S. (2000). Fen bilgisi öğretmen adaylarının laboratuvar dersine karşı tutumlarının incelenmesi. *D.E.Ü. Buca Eğitim Fakültesi Dergisi, 12,* 56–64.

Yang, X. (2015). Rural junior secondary school students' perceptions of classroom learning environments and their attitude and achievement in mathematics in West China. *Learning Environments Research, 18*(2), 249–266.*

Chapter 5
The Effect of Anxiety on Student Achievement

Evren Erzen

5.1 Introduction

Anxiety is a feeling that is often experienced in daily life and it has many forms. It is defined as a particular tension, apprehension and increased neural activity perceived at the level of consciousness (Spielberger et al. 1970). According to Sarason (1981), anxiety refers to personal sorrows which emerge from an individual's perceptions of inability. In this context, anxiety is affected by many life factors and it affects many factors as well. By its nature, anxiety creates a continuous low-level uncomfortable mood in humans. This state of discomfort causes many problems in the individual's life. These problems may be psychopathologic (Legerstee et al. 2009) or they may stay at the neurotic level as in the case of test anxiety (Erzen and Odacı 2014). Test anxiety is one of the anxiety types that individuals experience during their education life. Test anxiety, which is the anxiety that occurs during exams or similar testing conditions (Putwain et al. 2010), can influence adolescents' academic outcomes.

Studies have revealed that test anxiety is a factor that creates discomfort in students and it causes failure (Putwain and Best 2011; Wachelka and Katz 1999). In this context, since test anxiety affects the academic life of the individual, it is quite understandable that educational research focuses on test anxiety rather than on state-trait or social anxiety (Burke and Ruppel 2015; Fisher et al. 2004). On the other hand, test anxiety is not the only subject of anxiety research. There are many studies focusing on the anxieties experienced in different fields, such as the anxiety that sports-men/women face in their competition with other athletes (Ivanović et al. 2015), in financial accounting (Dull et al. 2015), in military trainings (Naditch et al. 1975)

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and in musical performance (Kobori et al. 2011). Similarly to test anxiety research, these studies are focused on how anxiety affects individuals' achievement in a particular field.

The relationship between achievement and anxiety is bidirectional and inversely proportional. An increase in achievement causes a decrease in anxiety and an increase in anxiety causes a decrease in achievement. This relationship between achievement and anxiety is related to certain capabilities of human psychology, namely trying to predict the future and processing past information. As they get successful, individuals can code the way of reaching achievement in their minds, eliminate the factors that cause failure and determine the shortest way to success. In other words, as they get successful, individuals develop ways of being even more successful and they can more easily predict the future. This creates a relief eliminating uncertainty about the future and leading to the reduction of anxiety. This functioning of success is expressed in the literature by concepts such as self-efficacy (Bandura et al. 1988) and self-confidence (Gürşen Otacıoğlu 2008). In other words, individuals experience anxiety when they cannot predict the future and they cannot foresee what will happen next. Research on test anxiety has revealed that students experience more anxiety in numeric courses, such as mathematics (Al Mutawah 2015; Hong et al. 2016; Maloney et al. 2015), chemistry (Aris and Siow 2007; Kurbanoğlu 2013) and statistics (Abd-El-Fattah 2005; Macher et al. 2013), which may be due to the fact that the tests of these courses are based on internalized operations rather than on memorization. In other words, such tests, which include different numbers and operations each time instead of certain specific texts to be memorized, prevent the students to predict what they will face next time and students' anxiety level increases. Thus, it is not surprising that the studies which look at the relationship between anxiety and achievement are mostly directed to situations that create anxiety such as the ones mentioned above.

This study investigated the effect of anxiety on achievement. In addition, the factors that are hypothesized to influence the effect size of anxiety on achievement were set as moderators. These moderators are the following: (*i*) the publication year of the research, (*ii*) the publication type of the research, (*iii*) the country (culture) where the research was carried out, (*iv*) the course in which the achievement was measured and (*v*) the level of education.

5.2 Method

5.2.1 Study Design

In this study, the effect of anxiety on student achievement was tested with a meta-analysis design.

5.2.2 Review Strategy and Criteria for Inclusion/Exclusion

To determine the research studies to include in the meta-analysis, the Science-Direct, Proquest and Ebsco academic databases were used to conduct a literature review. For this process, the terms *anxiety* and *student achievement/student success* included in the titles of the studies were used to screen the research studies. The end date for the research studies included in the research was identified as January 2016. Doctoral dissertations and peer-reviewed journals were included in the study.

Many strategies were used to identify the research studies that were appropriate for the meta-analysis of the study. First, a research study pool (328 research studies) was established; it included all studies with anxiety and student achievement/success in their titles. The abstracts of these studies were reviewed, and all were found to be appropriate to include in the study. In the second stage, all research studies in the pool were examined in detail. The results of the examination found that 151 of the research studies in the pool were appropriate, and 177 were not found to be suitable. The descriptive statistics of the 151 research studies included in the analysis are presented in Table 5.1.

The criteria for inclusion of the research studies in the analysis study were identified as follows:

- To have the statistical information necessary for correlational meta-analysis (n and r, or R^2 values)
- To be a study measuring the correlation school culture and student achievement/ success.

Reasons for not including a research study in the meta-analysis:

- Having no quantitative data (qualitative research)
- Not having a correlation coefficient
- Not focusing on student achievement
- Not focusing on anxiety.

5.2.3 Coding Process

The coding process was essentially a data sorting process used to ascertain which data were clear and suitable for the study. In this scope, a coding form was developed before the statistical analysis was conducted, and the coding was conducted according to the form. The main aim was to develop a specific coding system that allowed the study to see the entirety of the research studies in general and that would not miss any characteristics of each individual research study. The coding form developed in the study was comprised of:

Table 5.1 Characteristics of the studies included in the meta-analysis

Options	1	2	3	4	5	6	7	8	Total
Publication year	1955–1966	1967–1976	1977–1986	1987–1996	1997–2006	2007–2016	–	–	
	19	16	7	8	15	86	–	–	
Publication type	Thesis	Article	–	–	–	–	–	–	
	134	17	–	–	–	–	–	–	
Sample group	Horizontal individualism	Vertical collectivism	PISA	–	–	–	–	–	
	91	57	3	–	–	–	–	–	
Course	Education	Statistics	Chemistry	Mathematics	Psychology	Foreign language	Mixed	Other	
	3	6	6	45	8	10	57	16	
Level of education	Primary school	Middle school	High school	University	Mixed	Other	–	–	
	27	16	26	58	11	13	–	–	

- References for the research
- Sample information
- Sample group
- Publication type,
- Course
- Publication year
- Level of education
- Quantitative values.

5.2.4 Statistical Processes

The effect size acquired in meta-analysis is a standard measure value used in the determination of the strength and direction of the relationship in the study (Borenstein et al. 2009). Pearson's correlation coefficient (r) was determined to be the effect size in this study. Because the correlation coefficient has a value between +1 and −1, the *r* value calculated was evaluated by converting this value into the value as it appears in the *z* table (Hedges and Olkin 1985). Provided that more than one correlation value is given between the same structure categories in correlational meta-analysis studies, two different approaches are used in the determination of the one to be used in the meta-analysis (Borenstein et al. 2009; Kulinskaya et al. 2008). For this study, (*i*) first, if the correlations were independent, all the related correlations were included in the analysis and were considered to be independent studies, and (*ii*) if there were dependent correlations, then the *highest correlation value* was accepted. A *random effect model* was used for the meta-analysis processes in this study. The *Comprehensive Meta-Analysis* program was used in the meta-analysis process.

5.2.5 Moderator Variables

To determine the statistical significance of the differences between the moderators of the study, only the Q_b values were used. Four moderator variables that were expected to have a role in the average effect size were identified in the study. The first of these considered is the *type of publication* as a moderator in regards to the relationship between anxiety and student achievement. The second is the *sample group* which was thought to have a role on the average impact of school culture on student achievement. The rest are the *school subject*, *years of the studies*, and *class level*.

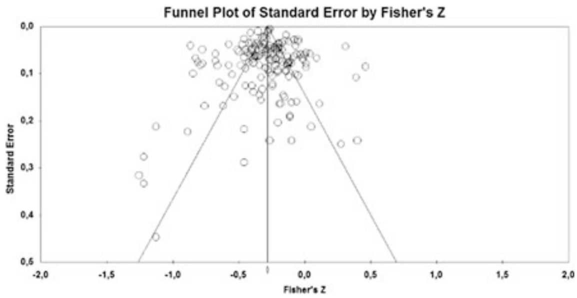

Fig. 5.1 Effect size funnel for publication bias

Table 5.2 Duval, Tweedie's trim and fill test results

	Excluded studies	Point estimate	*CI* (Confidence interval)		*Q*
			Lover limit	Upper limit	
Observed values		−.27	−.28	−.27	2087.64
Corrected values	16	−.28	−.29	−.28	2819.55

5.2.6 Publication Bias

A funnel plot for the research studies included in the meta-analysis of can be seen in Fig. 5.1. Evidence that publication bias affected the research studies included in the meta-analysis can be seen in Fig. 5.1. A serious asymmetry would be expected in the funnel plot if there were a publication bias. The concentration of plots on one side under the line of average effect size, particularly in the bottom section of the funnel, suggests the probability of a publication bias in the research studies. Evidence for publication bias was observed for the 151 research studies included in the meta-analysis study.

A publication bias was observed in the funnel plot, and the results of *Duval and Tweedie*'*s trim and fill test*, which was applied to determine the effect size related to partiality in the publications that was acquired with the meta-analysis using the random effect model, are shown in. As seen in Table 5.2, there is a difference between the observed effect size and the virtual effect size established to correct the effect of the publication bias. The reason for the difference is the asymmetry of the concentration on both sides of the center line and the studies plotted to the left of and above the center line, skewing the symmetry.

5.3 Findings

Table 5.3 shows the results of the meta-analysis about the relationship between anxiety and achievement. The findings supported hypothesis H_1 which formulated that there is a negative relationship between anxiety and achievement. The effect

Table 5.3 Findings of the correlations between anxiety and achievement: Results of meta-analysis

Variable	*k*	*N*	*r*	*CI*		*Q*	Q_b
				Lower limit	Upper limit		
Kaygı	151	115086	−.28*	−.30	−.25	2087.64*	
Moderator [Publication year]							27.01*
1955–1966	19		−.22*	−.29	−.15		
1967–1976	16		−.20*	−.28	−.12		
1977–1986	7		.03	−.12	.18		
1987–1996	8		−.30*	−.40	−.19		
1997–2006	15		−.30*	−.38	−.23		
2007–2016	86		−.31*	−.34	−.28		
Moderator [Publication type]							**4.23*** **
Article	134		−.28*	−.31	−.26		
Thesis	17		−.19*	−.28	−.11		
Moderator [Country]							2.35
Horizontal individualism	91		−.29*	−.33	−.26		
Vertical collectivism	57		−.26*	−.29	−.22		
PISA	3		−.23***	−.41	−.03		
Moderator [Course]							7.39
Education	3		−.28***	−.51	−.03		
Statistics	6		−.17***	−.31	.02		
Mixed	57		−.28*	−.32	−.23		
Chemistry	6		−.21**	−.35	−.07		
Mathematics	45		−.30*	−.35	−.25		
Psychology	8		−.33*	−.45	−.20		
Foreign language	10		−.23*	−.33	−.12		
Other	16		−.29*	−.37	−.21		
Moderatör [Level of education]							3.64
Primary school	27		−.25*	−.32	−.19		
Mixed	11		−.31*	−.39	.21		
High School	26		−.25*	−.31	−.19		
Secondary school	16		−.33*	−.40	−.26		
University	58		−.27*	−.32	−.23		
Other	13		−.28*	−.38	−.17		

*p < .001
**p < .01
***p < .05

size of anxiety on achievement was calculated as −.28, which showed that anxiety has a low level negative effect (Cohen 1988) on student achievement.

The research supported hypothesis H_2 hypothesis which formulated that the publication year of the studies examined plays a moderator role in the effect of anxiety on achievement. As a result of the moderator analysis, the difference between the effect sizes of the different publication years was found to be statistically significant ($Q_b = 27.01$, $p < .001$). In this context, according to the studies published between 1955 and 1966 [$r = -.22$], in 1967–1976 [$r = -.20$] and in 1987–1996 [$r = -.23$] the effect of anxiety on achievement was at a low level, whereas according to those published between 1997 and 2006 [$r = -.30$] and in 2007–2016 [$r = -.31$] this effect was at a medium level. At the same time, the effect of anxiety on achievement was not found to be statistically significant in the studies published between 1977 and 1986.

The findings of this research supported hypothesis H_3 which formulated that the publication type plays a moderator role in the effect size of anxiety on student achievement ($Qb = 4.23$, $p < .05$). Accordingly, it was found that anxiety has a low level effect on achievement in both papers [$r = -.28$] and theses [$r = -.19$].

The results of moderator analysis did not support hypothesis H_4 which formulated that the country (culture) where the research was carried out plays a moderator role in the effect of anxiety on achievement. Although the effect size differences were not found to be statistically significant ($Qb = 2.35$, $p > .05$), anxiety has a low level significant effect on achievement in both vertical-collectivist cultures [$r = -.26$] and horizontal individualistic culture [$r = -.29$]. On the other hand, some of the studies included in the research pool ($N = 3$) have been conducted using PISA data. These studies were also included in the moderator analysis. The findings showed that anxiety has a low level significant effect on achievement in the countries where PISA data was collected.

The results of the moderator analysis did not support hypothesis H_5 which formulated that different courses play a moderator role in the effect size of anxiety on achievement. Although the effect size differences were not statistically significant ($Qb = 7.39$, $p > .05$), the studies featuring education [$r = -.28$], statistics [$r = -.17$], chemistry [$r = -.21$], foreign language [$r = -.23$], mixed [$r = -.28$] and other [$r = -.29$] courses showed that anxiety has a low level significant effect on achievement. Moreover, it was found that in the studies conducted for mathematics [$r = -.30$] and psychology [$r = -.33$] courses anxiety has a medium level significant effect.

In this study, the level of education was taken as the last moderator variable. The results of the analysis did not support hypothesis H_6 which formulated that the level of education plays a moderator role in the effect of anxiety on achievement. Although the effect size difference was not found to be statistically significant ($Qb = 3.64$, $p > .05$), it was found that anxiety has a low level significant effect on achievement at primary school [$r = -.25$], high school [$r = -.25$], university [$r = -.27$] and other education levels [$r = -.28$], whereas it has a medium level significant effect at secondary school [$r = -.33$] and mixed [$r = -.31$] levels.

5.4 Conclusion

In this study, a meta-analysis was conducted in order to determine the effect size of anxiety on achievement. Thus, the general results obtained from previous theses and articles have been reviewed. In addition, it was examined whether the variables of publication year, publication type, the country (culture) where the research was carried out, the course and the level of education have a moderator role in the effect of anxiety on achievement.

The findings showed that anxiety has a negative and significant effect on achievement although the effect size is low. The significant effect of anxiety on achievement was an expected result. By its nature, anxiety is nourished from the uncertainties present in the life of individuals. Anxiety feelings include not knowing what to face next, not being able to foresee future results and negativity. In this context, the negative relationship identified between achievement and anxiety is natural. The state of uncertainty experienced for an issue where there is an expectation of success affects achievement negatively, a phenomenon which was also mentioned in social learning theory. Explaining the prediction capacity of the self-efficacy concept, Bandura (1989) noted that the belief of individuals that they would be successful, in other words their self-efficacy, is directly related to predicting how the events will finally unfold. In other words, if individuals can foresee that they will be successful in the future and believe that they will succeed while undertaking a task, this increases their motivation (Bandura 2001a, b).

Regarding the significant differences among the publication years, which was set as a moderator variable for the study, it was found that there are significant differences in the effect of anxiety on achievement in all years, except for the studies published between 1977 and 1986. In addition, from 1955, which is the starting year for the studies examined, until today a negative increase is observed in the effect size of the studies. In other words, the negative effect of anxiety on achievement is increasing every year. There are several possible reasons for this fact. First of all, the need and demand for education has increased as the population increased. Tests could determine the direction of one's life (for instance, getting a job). As a result of this fact, tests became more eliminative and they have started being applied even in the earlier stages of education. This is causing more intense anxiety to students and it might have led to the research result mentioned previously. In addition, the changes made in the content of the courses might have resulted in the negative increase of the effect of anxiety on achievement over the years. Another possible reason is that the number and importance of the tests that students face increase every year. For example, in 2015 around 603 thousand people have taken the exams run for teacher assignment in Turkey (OSYM 2015). Before 2002, however, the existence of such a test was out of question. The number of test takers who took the test for entering into the teaching profession was 173 thousand in 2005 (OSYM 2005), whereas this number increased to around 280 thousand in 2010 (OSYM 2010). In summary, this strengthening relationship between test anxiety and achievement seems to be a result of the changing conditions in today's world.

As a result of the moderator analysis, it was found that publication type plays a moderator role in the effect of anxiety on achievement. The review of the outcomes showed that there are significant differences between papers and theses. The theses have lower publication bias risk than the papers and this has allowed for the differentiation in the effect size of the two publication types. Most of the studies included in the meta-analysis are published works which tend to result in only specific findings, whereas this concern is much lower for theses. This clustering of the findings at one side is called publication bias in the literature (Borenstein et al. 2009). This study, which considers publication type as a moderator, shows that the type of the analyzed studies may create a difference in the effect of anxiety on achievement. The findings show that more negative values were obtained in papers compared to theses. Although this fact seems to support the suspicions about publication bias, the examination of the samples shows that data was collected from large samples, such as PISA, and from many different sources. Given that the data from sources like PISA includes a high number of samples without any publishing concerns, it can be argued that the small and insufficient sample size of the theses might have caused this difference. A detailed review of the findings shows that the number of theses is low and after the 2000s the number theses is scarce, whereas the number of studies increases. In other words, the significant differences in the effect sizes of theses and other studies (articles and papers) in a course of almost 20 years seems understandable.

Although it was not a moderator in this study, the differentiation of the countries and cultures where the research was carried out has a significant effect on the anxiety-achievement relationship. In other words, the anxiety that horizontal-individualistic and vertical-collectivist cultures experience has significant effects on their achievement. The results showed that this effect is similar in both the studies conducted in vertical-collectivist communities, which we can roughly call as the Eastern cultures, and in the studies conducted in horizontal-individualistic communities, which we can describe as Western cultures; the effect varies, however, within each culture. In general, in horizontal-individualistic communities people get credit for their success, whereas in vertical-collectivist communities the credit is given to their community (Triandis et al. 1988). This phenomenon is associated with the individual's self-identification type. In the literature, this concept is called self-construal. The research about achievement and self-construal showed that individualistic communities are academically more successful (İlhan 2009), whicle collectivist communities get better results in terms of handling and solving problems (Yavuz 2013). However, when the issue is the effect of anxiety on achievement the results clearly show that the influence of culture is eliminated, which points towards the universality of human psychology in terms of anxiety.

The conducted analysis revealed that the course in which the achievement was measured does not have a moderator role in the effect of anxiety on achievement. On the other hand, a significant effect was observed for each course. This shows that the effect size of anxiety on achievement differed for each course. On the other hand, all the effect sizes obtained in the various course groups are at a low and medium level and they are close to each other. According to this result, students get anxious when they are tested in verbal content courses, such as psychology (Ruthig et al. 2004) as well as in numeric content courses, such as maths or chemistry (Hart et al. 2016), and this affects student achievement negatively. This shows that anxiety affects achievement negatively in both the courses containing verbal knowledge that has to be memorized and the numeric courses that do not require memorization. Therefore, practitioners may reduce the high level of uncertainty and anxiety experienced in the courses by focusing on students getting the required skills through practice and performance instead of focusing on testing theoretical knowledge.

The analysis revealed that the level of education does not play a moderator role in the effect of anxiety on achievement. On the other hand, it was observed that the effect size of each education level was significant. In other words, the level of education is not a moderator for the effect of anxiety on achievement but the various education levels differ from each other. In other words, anxiety affects achievement negatively in each education level separately and the effect sizes of the education levels are low or medium. The results are similar in the "other" group which includes graduates, disabled students, athletes and artists and in the "mixed" group which includes the studies that have been conducted at two or more education levels simultaneously. This shows that the anxiety experienced during the education life is a variable affecting achievement regardless the education level. Whether in a formal educational institution or in a more independent area, such as sports (Ivanović et al. 2015; Yamada et al. 2012) or art (Kobori et al. 2011), when people get anxious their achievement is affected negatively. A careless point of view may misinterpret the validity of the results arguing that "unconcerned people can't be successful, anxiety is required". However, what is required for achievement is not "anxiety" but rather a reasonable level of "stress". Stress is a variable that affects the achievement of an individual negatively if it is too high or too low. But when it is at the optimum level it provides then a positive and motivating power (As cited in Muse et al. 2003). On the other hand, a high level of anxiety creates uncertainty (as cited in Çelebi 2015) which restricts the foreseeing of individuals and, therefore, its effects on achievement are very negative.

References

Note. "*" References marked with an asterisk indicate studies included in the meta-analysis. The in-text citations to studies selected for meta-analysis are not followed by asterisks.

Abd-El-Fattah, S. M. (2005). The effect of prior experience with computers, statistical self-efficacy, and computer anxiety on students' achievement in an introductory statistics course: A partial least squares path analysis. *International Education Journal*, *5*(5), 71–79.*

Ader, E., & Erktin, E. (2010). Coping as self-regulation of anxiety: A model for math achievement in high-stakes tests. *Cognition Brain Behavior*, *XIV*(4), 311–332.*

Ahlem, L. H. (1962). *The relationships of classroom climate to teachers' knowledge of pupils' sociometric status, manifest anxiety, ability, achievement, and socioeconomic status.* Unpublished doctoral dissertation, The University of Southern California, California.*

Ahmad, S., Hussain, D. A., & Azeem, M. (2012). Relationship of academic SE to self-regulated learning, SI, test anxiety and academic achievement. *International Journal of Education*, *4*(1), 12–25. http://doi.org/10.5296/ije.v4i1.1091*

Akbaş, A., & Kan, A. (2007). Affective factors that influence chemistry achievement (motivation and anxiety) and the power of these factors to predict chemistry achievement-II. *Education Turkish Science*, *4*(1), 10–19.*

Al Mutawah, M. A. (2015). The influence of mathematics anxiety in middle and high School students math achievement. *International Education Studies*, *8*(11), 239. http://doi.org/10.5539/ies.v8n11p239

Alpert, R. (1957). *Anxiety in academic achievement situations: Its measurement and relation to aptitude*. Unpublished doctoral dissertation, Stanford University, California.*

Amiri, M., & Ghonsooly, B. (2015). The relationship between English learning anxiety and the students' achievement on examinations. *Journal of Language Teaching and Research*, *6*(4), 855–865.

Aris, S. R. S., & Siow, H.-L. (2007). Relationship between chemistry anxiety and achievement in chemical bonding among electrical engineering students. *International Journal of Learning*, *14*(6), 37–41. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=eue&AN=28652098&site=ehost-live*

Ashtiani, A. F., Ejei, J., Khodapanahi, M.-K., & Tarkhorani, H. (2007). Relationship between self-concept, self-esteem, anxiety, depression and academic achievement in adolescents. *Journal of Applied Sciences*, *7*(7), 995–1000.*

Atef-vahid, S., & Fard-Kashani, A. (2011). The effect of English learning anxiety on Iranian high-school students' English language achievement. *Broad Research in Artificial Intelligence and Neuroscience*, *2*(3), 29–41.*

Atkinson, J. W., & Litwin, G. H. (1960). Achievement motive and test anxiety conceived as motive to approach success and motive to avoid failure. *Journal of Abnormal and Social Psychology*, *60*(1), 52–63. http://doi.org/10.1037/h0041119*

Bagana, E. (2014). Adolescents' depression, self-perceived success in academic domain, vulnerability to depression and anxiety. *Procedia—Social and Behavioral Sciences*, *127*, 287–291. http://doi.org/10.1016/j.sbspro.2014.03.257*

Bandalos, D. L., Yates, K., & Thorndike-Christ, T. (1995). Effects of math self-concept, perceived self-efficacy, and attributions for failure and success on test anxiety. *Journal of Educational Psychology*, *87*(4), 611–623. http://doi.org/10.1037/0022-0663.87.4.611*

Bandura, A. (1989). Human agency in social cognitive theory. *The American Psychologist*, *44*(9), 1175–1184. http://doi.org/10.1037/0003-066x.44.9.1175

Bandura, A. (2001a). Social cognitive theory: An agentic perspective. *Annual Review Psychology, 52*(1), 1–26.

Bandura, A. (2001b). Social cognitive theory of mass communication. *Media Psychology, 3*(3), 265–299.

Bandura, A., Cioffi, D., Taylor, C. B., & Brouillard, M. E. (1988). Perceived self-efficacy in coping with cognitive stressors and opioid activation. *Journal of Personality and Social Psychology*, *55*(3), 479–488. http://doi.org/10.1037/0022-3514.55.3.479

Batumlu, D. Z., & Erden, M. (2007). Yıldız Teknik Üniversitesi yabancı diller yüksek okulu hazırlık öğrencilerinin yabancı dil kaygıları ile İngilizce başarıları arasındaki ilişki. *Journal of Theory and Practice in Education, 3*(1), 24–38.

Baya'a, N. F. (1990). Mathematics anxiety, mathematics achievement, gender, and socio-economic status among Arab secondary students in Israel. *International Journal of Mathematical Education in Science and Technology*, *21*(2), 319–324. http://doi.org/10.1080/0020739900210221*

Beilock, S. L., Gunderson, E. A., Ramirez, G., & Levine, S. C. (2010). Female teachers' math anxiety affects girls' math achievement. *Proceedings of the National Academy of Sciences of the United States of America*, *107*(5), 1860–3. http://doi.org/10.1073/pnas.0910967107*

Bekdemir, M., & Başıbüyük, A. (2011). The prediction of the levels of mathematics achievement and anxiety of the social sciences and primary education students to their geography achievement. *Gazi Eğitim Fakültesi Dergisi*, *31*(2), 459–477.*

Berryman, M. (1990). *Math anxiety, math avoidance, math attitude, and math achievement of college mathematics students*. Unpublished doctoral dissertation, Eastern Oregon State College, Oregon.*

Borenstein, M., Hedges, L. V., Higgins, J. P. T., & Rothstein, H. R. (2009). *Introduction to meta-analysis*. http://doi.org/10.1002/9780470743386

Bronzaft, A. L. (1968). Test anxiety, social mobility, and academic achievement. *Journal of School Psychology*, *75*, 217–222.*

Brook, C. A., & Willoughby, T. (2015). The social ties that bind: Social anxiety and academic achievement across the university years. *Journal of Youth and Adolescence*, *44*(5), 1139–1152. http://doi.org/10.1007/s10964-015-0262-8*

Burke, T. J., & Ruppel, E. K. (2015). Facebook self-presentational motives: Daily effects on social anxiety and interaction success. *Communication Studies*, *66*(2), 204–217. http://doi.org/10.1080/10510974.2014.884014*

Cheema, J. R., & Sheridan, K. (2015). Time spent on homework, mathematics anxiety and mathematics achievement: Evidence from a US sample. *Issues in Educational Research*, *25*(3), 246–259.*

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Hillsdale, New Jersey: Lawrence Erlbaum Associates Publishers.

Cottle, T. J. (1969). Temporal correlates of the achievement value and manifest anxiety. *Journal of Consulting and Clinical Psychology*, *33*(5), 541–550. http://doi.org/10.1037/h0028290*

Cowen, E. L., Zax, M., Klein, R., Izzo, L. D., & Trost, M. A. (1965). The relation of anxiety in school children to school record, achievement, and behavioral measures. *Child Development*, *36*(3), 685. http://doi.org/10.2307/1126914*

Cox, F. N. (1964). Test anxiety and achievement behavior system related to examination performance in children. *Child Development*, *35*(3), 909–915. http://doi.org/10.2307/1126515*

Çelebi, E. (2015). Farklı kültürel ortamlara göçte yaşanılan kaygı ve belirsizlik sorunu. *Sosyal Politika Çalışmaları Dergisi, 15*(34), 27–39.

Çiftçi, Ş. K. (2015). Effects of secondary school student' perceptions of mathematics education quality on mathematics anxiety and achievement. *Educational Sciences: Theory & Practice*, *15*(6), 1487–1502. http://doi.org/10.12738/estp.2015.6.2829*

Dereli, E., Angın, E., & Karakuş, Ö. (2012). Factors that affect the problem solving skills of preschool teacher candidates: Academic achievement and types of anxiety. *International Journal of Human Sciences*, *9*(2), 731–742.*

Dikkartın Övez, F. T. (2012). An examination on the relation between mathematics anxiety and achievements of 5th, 6th, 7th and 8th Grade Students. *International Mathematical Forum*, *7*(60), 2987–2994.*

Dove, A., & Dove, E. (2015). Examining the influence of a flipped mathematics course on preservice elementary teachers' mathematics anxiety and achievement. *Electronic Journal of Mathematics & Technology*, *9*(2), 166–179.

Dull, R. B., Schleifer, L. L. F., & McMillan, J. J. (2015). Achievement goal theory: The relationship of accounting students' goal orientations with self-efficacy, anxiety, and achievement. *Accounting Education*, *24*(2), 152–174. http://doi.org/10.1080/09639284.2015.1036892*

El-Anzi, F. O. (2005). Academic achievement and its relationship with anxiety, self-esteem, Optimism, and pessimism in Kuwaiti students. *Social Behavior and Personality: An International Journal*, *33*(1), 95–104. http://doi.org/10.2224/sbp.2005.33.1.95*

Elliot, A. J., & McGregor, H. A. (1999). Test anxiety and the hierarchical model of approach and avoidance achievement motivation. *Journal of Personality and Social Psychology*, *76*(4), 628–644.*

Erden, M., & Akgül, S. (2010). Predictive power of math anxiety and perceived social support from teacher for primary students' mathematics achievement. *Journal of Theory and Practice in Education*, *6*(1), 3–16.*

Erkek, Ö., & Işıksal Bostan, M. (2015). The role of spatial anxiety, geometry self-efficacy and gender in predicting geometry achievement. *Elementary Education Online*, *14*(1), 164–181. http://doi.org/10.17051/io.2015.18256*

Erzen, E., & Odacı, H. (2014). The effect of the attachment styles and self-efficacy of adolescents preparing for university entrance tests in Turkey on predicting test anxiety. *Educational Psychology* (October 2014), 1–14. http://doi.org/10.1080/01443410.2014.923555

Feather, N. T. (1965). Performance at a difficult task in relation to initial expectation of success, test anxiety, and need achievement. *Journal of Personality*, *33*, 200–17. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/14299697*

Feldhusen, J. F., & Klausmeier, H. J. (1962). Anxiety, intelligence, and achievement in children of low, average, and high intelligence. *Child Development*, *33*, 403–409.*

Fincham, F. D., Hokoda, A., & Sanders, R. J. (1989). Learned helplessness, test anxiety, and academic achievement: A longitudinal analysis. *Child Development*, 138–145.*

Fisher, P. H., Masia-Warner, C., & Klein, R. G. (2004). Skills for social and academic success: a school-based intervention for social anxiety disorder in adolescents. *Clinical Child and Family Psychology Review*, *7*(4), 241–249. http://doi.org/10.1007/s10567-004-6088-7

Gherasim, L. R., & Butnaru, S. (2012). The effort attribution, test anxiety and achievement in sciences: The moderating effect of parental behaviour. *The International Journal of Learning*, *18*(10), 283–294.*

Ghorbandordinejad, F., & Nasab, A. H. F. (2013). Examination of the relationship between perfectionism and English achievement as mediated by foreign language classroom anxiety. *Asia Pacific Education Review*, *14*(4), 603–614. http://doi.org/10.1007/s12564-013-9286-5*

Goetz, T., Preckel, F., Zeidner, M., & Schleyer, E. (2008). Big fish in big ponds: A multilevel analysis of test anxiety and achievement in special gifted classes. *Anxiety, Stress, and Coping*, *21*(2), 185–198. http://doi.org/10.1080/10615800701628827*

Greene, D. L. (1970). *The relations among general anxiety, defensiveness, intelligence, and scholastic achievement in elementary school children*. Unpublished master thesis. The University of Southern California, California.*

Grooms, R. R., & Endler, N. S. (1960). The effect of anxiety on academic achievement. *Journal of Educational Psychology*, *51*(5), 299–304. http://doi.org/10.1037/h0042077*

Gürşen Otacıoğlu, S. (2008). Öğretmen adaylarının problem çözme becerileri ile öz güven düzeylerinin incelenmesi. *Educational Sciences: Theory & Practice*, *8*(3 September), 893–924.

Hadley, K. M., & Dorward, J. (2011). Investigating the relationship between elementary teacher mathematics anxiety, mathematics instructional practices, and student mathematics achievement. *Journal of Curriculum and Instruction*, *5*(2), 27–44. http://doi.org/10.3776/joci.2011.v5n2p27-44*

Hagenson, C. E. (1983). *Attitude toward statistics as a function of mathematics anxiety, sex-role preference, and achievement in an introductory statistics course*. Unpublished master thesis. Mcgill University, Montreal.

Hamid, M. H. S., Shahrill, M., Matzin, R., Mahalle, S., & Mundia, L. (2013). Barriers to mathematics achievement in Brunei secondary school students: Insights into the roles of mathematics anxiety, self-esteem, proactive coping, and test stress. *International Education Studies*, *6*(11), 1–14. http://doi.org/10.5539/ies.v6n11p1*

Hart, S. A., Logan, J. A. R., Thomson, L., Kovas, Y., McLoughlin, G., & Petrill, S. A. (2016). A latent profile analysis of math achievement, numerosity, and math anxiety in twins. *Journal of Educational Psychology*, *108*(2), 181–193. http://doi.org/10.1177/019263659407855910*

Hawkes, T. H., & Furst, N. F. (1971). Race, socio-economic situation, achievement, IQ, and teacher ratings of students' behavior as factors relating to anxiety in upper elementary school children. *Sociology of Education*, *44*(3), 333–350. http://doi.org/. doi:10.2307/2111996*

Hedges, L. V., & Olkin, I. (1985). *Statistical method for meta-analysis*. United Kingdom: Academic Press.

Higgins, I. D. (1964). *An eprical study of listening related to anxiety and to certain other measures of ability and achievement*. Unpublished doctoral dissertation, The University of Southern California, California*.

Hill, K. T., & Dusek, J. B. (1969). Children's achievement expectations as a function of social reinforcement, Sex of S, and Test Anxiety. *Child Development*, *40*(2), 547. http://doi.org/10.2307/1127422*

Hong, E., Mason, E., Peng, Y., & Lee, N. (2016). Effects of homework motivation and worry anxiety on homework achievement in mathematics and English. *Educational Research and Evaluation*, *3611*(February), 1–24. http://doi.org/10.1080/13803611.2015.1131721*

İlhan, T. (2009). *Üniversite öğrencilerinin benlik uyumu modeli yaşam amaçları, temel psikolojik ihtiyaçlar ve öznel iyi oluş* (Yayımlanmamış Doktora Tezi). Ankara, Gazi Üniversitesi.

Ivanović, M., Milosavljević, S., & Ivanović, U. (2015). Anxiety in sport, and sport achievement in adolescence. *Sport Science*, *8*(1), 35–42.*

Jansen, B. R. J., Louwerse, J., Straatemeier, M., Van der Ven, S. H. G., Klinkenberg, S., & Van der Maas, H. L. J. (2013). The influence of experiencing success in math on math anxiety, perceived math competence, and math performance. *Learning and Individual Differences*, *24*, 190–197. http://doi.org/10.1016/j.lindif.2012.12.014*

Jensen, W. R. (1961). *Anxiety, n-achievement, aptitude, and prior knowledge as predictors of college achievement*. Unpublished doctoral dissertation, University of Nebraska, Nebraska.*

Jodai, H., Zafarghandi, A. M. V., & Tous, M. D. (2013). Motivation, integrativeness, organizational influence, anxiety, and English achievement. *Glottotheory*, *4*(2), 3–26. http://doi.org/10.1524/glot.2013.0012*

Jost, O. R. (1997). *Computer anxiety, mathematics anxiety and achievement in an adult basic mathematics course*. Unpublished master thesis. University of Regina, Canada. http://doi.org/10.16953/deusbed.74839*

Kalaycıoğlu, D. B. (2015). The influence of socioeconomic status, self-efficacy, and anxiety on mathematics achievement in England, Greece, Hong Kong, the Netherlands, Turkey, and the USA. *Kuram ve Uygulamada Egitim Bilimleri*, *15*(5), 1391–1401. http://doi.org/10.12738/estp.2015.5.2731*

Khalaila, R. (2015). The relationship between academic self-concept, intrinsic motivation, test anxiety, and academic achievement among nursing students: Mediating and moderating effects. *Nurse Education Today*, *35*(3), 432–438. http://doi.org/10.1016/j.nedt.2014.11.001*

Kılınçkaya. (2013). Relationship between test anxiety and students' achievement in Atatürk's principles and revolution course. *Mehmet Derviş*, *28*(1), 235–243.*

King, F. J., Heinrich, D. L., Stephenson, R. S., & Spielberger, C. D. (1976). An investigation of the causal influence of trait and state anxiety on academic achievement. *Journal of Education & Psychology*, *68*(3), 330–334. http://doi.org/10.1037/0022-0663.68.3.330*

Klugh, H. E., & Bendig, A. W. (1955). The Manifest anxiety and ACE scales and college achievement. *Journal of Consulting Psychology*, *19*(6), 487. http://doi.org/10.1037/h0045336*

Kobori, O., Yoshie, M., Kudo, K., & Ohtsuki, T. (2011). Traits and cognitions of perfectionism and their relation with coping style, effort, achievement, and performance anxiety in Japanese musicians. *Journal of Anxiety Disorders*, *25*(5), 674–679. http://doi.org/10.1016/j.janxdis.2011.03.001*

Koszycki, D., Raab, K., Aldosary, F., & Bradwejn, J. (2010). A multifaith spiritually based intervention for generalized anxiety disorder: A pilot randomized trial. *Journal of Clinical Psychology*, *66*(4), 430–441. http://doi.org/10.1002/jclp*

Krawchuk, L. L. (2008). *Procrastination, self-efficacy calibration, anxiety, and achievement in undergraduate students*. Unpublished master thesis. University of Alberta, Alberta.*

Kulinskaya, E., Morgenthaler, S., & Staudte, R. G. (2008). *Meta analysis: A guide to calibrating and combining statistical evidence*. John Wiley & Sons.
Kurbanoğlu, N. I. (2013). The effects of organic chemistry anxiety on undergraduate students in relation to chemistry attitude and organic chemistry achievement. *Journal of Baltic Science Education*, *12*(2), 130–138.*
Legerstee, J. S., Tulen, J. H. M., Kallen, V. L., Dieleman, G. C., Treffers, P. D. A., Verhulst, F. C., & Utens, E. M. W. J. (2009). Threat-related selective attention predicts treatment success in childhood anxiety disorders. *Journal of the American Academy of Child & Adolescent Psychiatry*, *48*(2), 196–205. http://doi.org/10.1097/CHI.0b013e31819176e4*
Lunneborg, P. W. (1964). Relations among social desirability, achievement, and anxiety measures in Cüchildren. *Child Development*, *35*, 169–82. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/14128805*
Luo, W., Hogan, D., Tan, L. S., Kaur, B., Ng, P. T., & Chan, M. (2014). Self-construal and students' math self-concept, anxiety and achievement: An examination of achievement goals as mediators. *Asian Journal of Social Psychology*, *17*, 184–195. http://doi.org/10.1111/ajsp.12058*
Ma, X. (1999). A meta-analysis of the relationship between anxiety toward mathematics and achievement in mathematics. *Journal for Research in Mathematics Education*, 520–540.*
Ma, X., & Xu, J. (2004). The causal ordering of mathematics anxiety and mathematics achievement: A longitudinal panel analysis. *Journal of Adolescence*, *27*(2), 165–179. http://doi.org/10.1016/j.adolescence.2003.11.003*
Macher, D., Paechter, M., Papousek, I., Ruggeri, K., Freudenthaler, H. H., & Arendasy, M. (2013). Statistics anxiety, state anxiety during an examination, and academic achievement. *British Journal of Educational Psychology*, *83*(4), 535–549. http://doi.org/10.1111/j.2044-8279.2012.02081.x*
Maloney, E. A., Ramirez, G., Gunderson, E. A., Levine, S. C., & Beilock, S. L. (2015). Intergenerational effects of parents' math anxiety on children's math achievement and anxiety. *Psychological Science*, *26*(9), 1480–1488. http://doi.org/10.1177/0956797615592630
Margles, J. S. (1984). *Perception, self-esteem, anxiety and achievement associated with special class placement*. Unpublished master thesis. York University, Toronto.*
Matzin, R., Shahrill, M., Mahalle, S., Hamid, M. H. S., & Mundia, L. (2013). A comparison of learning styles and study strategies scores of brunei secondary school students by test anxiety, success attributions, and failure attributions: Implications for teaching at-risk and vulnerable students. *Review of European Studies*, *5*(5), 119–127. http://doi.org/10.5539/res.v5n5p119*
Mccandless, B. R., & Castaneda, A. (1956). Anxiety in children, school achievement, and intelligence. *Child Development*, *27*(3), 379–382.*
McCann, S. J. H., & Meen, K. S. (1984). Anxiety, ability, and academic achievement. *The Journal of Social Psychology*, *124*, 257–258.*
McEwan, L., & Goldenberg, D. (1999). Achievement motivation, anxiety and academic success in first year Master of Nursing students. *Nurse Education Today*, *19*(5), 419–430. http://doi.org/10.1054/nedt.1999.0327*
Mohammadyari, G. (2012). Comparative study of relationship between general perceived self-efficacy and test anxiety with academic achievement of male and female students. *Procedia—Social and Behavioral Sciences*, *69*, 2119–2123. http://doi.org/10.1016/j.sbspro.2012.12.175*
Morony, S., Kleitman, S., Lee, Y. P., & Stankov, L. (2013). Predicting achievement: Confidence vs self-efficacy, anxiety, and self-concept in Confucian and European countries. *International Journal of Educational Research*, *58*, 79–96. http://doi.org/10.1016/j.ijer.2012.11.002*
Muse, L. A., Harris, S. G., & Feild, H. S. (2003). Has the inverted-U theory of stress and job performance had a fair test? *Human Performance*, *16*(4), 349–364. http://doi.org/10.1207/S15327043HUP1604_2
Nadeem, M., Ali, A., Maqbool, S., & Zaidi, S. (2012). Impact of anxiety on the academic achievement of students having different mental abilities at university level in Bahawalpur (southern Punjab) Pakistan. *International Online Journal of Educational Sciences*, *4*(3),

519–528. Retrieved from http://www.acarindex.com/dosyalar/makale/acarindex-1423904276.pdf*
Naditch, M. P., Gargan, M. a., & Michael, L. B. (1975). Denial, anxiety, locus of control, and the discrepancy between aspirations and achievements as components of depression. *Journal of Abnormal Psychology*, *84*(1), 1–9. http://doi.org/10.1037/h0076254*
Newbegin, I., & Owens, A. (1996). Self-esteem and anxiety in secondary school achievement. *Journal of Social Behavior & Personality*, *11*(3), 521–530.*
Núñez-Peña, M. I., Suárez-Pellicioni, M., & Bono, R. (2013). Effects of math anxiety on student success in higher education. *International Journal of Educational Research*, *58*, 36–43. http://doi.org/10.1016/j.ijer.2012.12.004*
Nyroos, M., Jonsson, B., Korhonen, J., & Eklo, H. (2015). Children's mathematical achievement and how it relates to working memory, test anxiety and self-regulation: A person-centred approach, *6*(1), 73–97.*
Okur, M., & Bahar, H. H. (2010). Learning styles of primary education prospective mathematics teachers; States of trait-anxiety and academic success. *Procedia—Social and Behavioral Sciences*, *2*(2), 3632–3637. http://doi.org/10.1016/j.sbspro.2010.03.565*
Onwuegbuzie, A. J., & Jiao, Q. G. (2004). Information search performance and research achievement: An empirical test of the anxiety-expectation mediation model of library anxiety. *Journal of American Society for Information Science and Technology*, *55*(1), 41–54.*
Opateye, J. A. (2014). The relationship between emotional intelligence, test anxiety, stress, academic success and attitudes of high school students towards electrochemistry. *Ife PsychologIA*, *22*(1), 239–249.*
Osborne, J. W. (2001). Testing stereotype threat: Does anxiety explain race and sex differences in achievement? *Contemporary Educational Psychology*, *26*(3), 291–310. http://doi.org/10.1006/ceps.2000.1052*
OSYM. (2005). *2005 KPSS sayısal bilgiler*. Retrieved from http://www.osym.gov.tr/belge/1-5583/2005-kpss-sayisal-bilgiler.html
OSYM. (2010). *2010-KPSS lisans: Sayısal bilgiler*. Retrieved from http://www.osym.gov.tr/belge/1-12100/2010-kpss-lisans-sayisal-bilgiler.html
OSYM. (2015). *2015-KPSS A grubu ve öğretmenlik ile ÖABT Sınav sonuçlarına ilişkin sayısal bilgiler*. Retrieved from http://dokuman.osym.gov.tr/pdfdokuman/2015/KPSS/2015-KPSSSAYISALBILGILER18092015.pdf
Papeika, K. (1982). *The relationship among test anxiety, self-concept, attitude, and science achievement*. Unpublished master thesis. Southern Connecticut State College, Connecticut.*
Patten, M. D. (1983). Relations between self-esteem, anxiety, and achievement in young learning disabled students. *Journal of Learning Disabilities*, *16*(1), 43–45. http://doi.org/10.3102/0002831213507327*
Patton, T. J. F. (1996). *Hardiness and anxiety as predictors of academic success in first year full and part-time post-rn students*. Unpublished master thesis. The University of Western Ontario, Ontario.*
Peleg, O. (2009). Test anxiety, academic achievement, and self-esteem among arab adolescents with and without learning disabilities. *Learning Disability Quarterly*, *32*(1), 11–20.*
Piji-Küçük, D. (2010). Müzik öğretmeni adaylarının sınav kaygısı, benlik saygısı ve çalgı başarıları arasındaki ilişkinin incelenmesi. *Ahi Evran Üniversitesi Eğitim Fakültesi Dergisi*, *11*(3), 37–50.*
Pouratashi, M., Movahed, H., & Zhu, C. (2013). Affect of agricultural students' academic self-efficacy beliefs on their achievement motivation and academic performance. *The New Educational Review*, 32818709.*
Putwain, D. W., & Best, N. (2011). Fear appeals in the primary classroom: Effects on test anxiety and test grade. *Learning and Individual Differences*, *21*(5), 580–584. http://doi.org/10.1016/j.lindif.2011.07.007
Putwain, D. W., Woods, K. A., & Symes, W. (2010). Personal and situational predictors of test anxiety of students in post-compulsory education. *British Journal of Educational Psychology*, *80*(1), 137–160. http://doi.org/10.1348/000709909X466082

Rahimi, M., & Yadollahi, S. (2011). Success in learning English as a foreign language as a predictor of computer anxiety. *Procedia Computer Science*, *3*, 175–182. http://doi.org/10.1016/j.procs.2010.12.030*

Raju, P. M., & Asfaw, A. (2009). Recalled test anxiety in relation to achievement, in the context of general academic self-concept, study habits, parental involvement and socio-economic status among Grade 6 Ethiopian students. *Education 3–13*, *37*(3), 269–285. http://doi.org/10.1080/03004270902734085*

Ramirez, G., Chang, H., Maloney, E. A., Levine, S. C., & Beilock, S. L. (2016). On the relationship between math anxiety and math achievement in early elementary school: The role of problem solving strategies. *Journal of Experimental Child Psychology*, *141*, 83–100. http://doi.org/10.1016/j.jecp.2015.07.014*

Rana, R., & Mahmood, N. (2010). The relationship between test anxiety and academic achievement. *Bulletin of Education and Research*, *32*(2), 63–74. Retrieved from http://results.pu.edu.pk/images/journal/pesr/PDF-FILES/4-RizwanAkramRana.pdf*

Ranđelović, D., Krstić, M., & Babić-Antić, J. (2014). Academic success, anxiety and depressiveness as the predictors of life satisfaction among the student. *Journal of Educational and Instructional Studies in the World*, *4*(4), 63–73.*

Raphelson, A. C. (1957). The relationships among imaginative, direct verbal, and physiological measures of anxiety in an achievement situation. *The Journal of Abnormal and Social Psychology*, *54*(1), 13–18.*

Rastegar, M. (2015). On the relationship between foreign language classroom anxiety, willingness to communicate and scholastic success among Iranian EFL learners. *Theory and Practice in Language Studies*, *5*(11), 2387–2394.*

Rezazadeh, M., & Tavakoli, M. (2009). Investigating the relationship among test anxiety, gender, academic achievement and years of study: A case of Iranian EFL University students. *English Language Teaching*, *2*(4), 68–74. http://doi.org/10.5539/elt.v2n4p68*

Ripple, R. E., Glock, M. D., & Millman, J. (1967). *The relationship of anxiety, compulsivity, creativity, and exhibitionism to success in learning from programed and conventional instruction*. Final Report.*

Ruthig, J. C., Perry, R. P., Hall, N. C., & Hladkyj, S. (2004). Optimism and attributional retraining: Longitudinal effects on academic achievement, test anxiety, and voluntary course withdrawal in college students. *Journal of Applied Social Psychology*, *34*(4), 709–730. http://doi.org/10.1111/j.1559-1816.2004.tb02566.x*

Sarason, I. G. (1981). Test anxiety, stress and social support. *Journal of Personality, 49,* 1–22.

Schreiber, K. M., Cunningham, S. J., Kunkov, S., & Crain, E. F. (2006). The association of preprocedural anxiety and the success of procedural sedation in children. *American Journal of Emergency Medicine*, *24*(4), 397–401. http://doi.org/10.1016/j.ajem.2005.10.025*

Seçken, N., & Seyhan, H. G. (2015). An analysis of high school students' academic achievement and anxiety over graphical chemistry problems about the rate of reaction: The case of Sivas province. *Procedia—Social and Behavioral Sciences*, *174*, 347–354. http://doi.org/10.1016/j.sbspro.2015.01.671*

Seng, E. L. K. (2015). The influence of pre-university students' mathematics test anxiety and numerical anxiety on mathematics achievement. *International Education Studies*, *8*(11), 162. http://doi.org/10.5539/ies.v8n11p162*

Sewell, T. E., Farley, F. H., & Sewell, B. (1983). Anxiety, cognitive style, and mathematics achievement. *The Journal of General Psychology*, *109*(1), 59–66.*

Sherman, B. F., & Post, D. P. W. (2003). Mathematics anxiety and mathematics achievement. *Mathematics Education and Research Journal*, *15*(2), 138–150.

Shores, M. L., & Shannon, D. M. (2007). The effects of self-regulation, motivation, anxiety, and attributions on mathematics achievement for fifth and sixth grade students. *School Science and Mathematics*, *107*(6), 225. http://doi.org/10.1111/j.1949-8594.2007.tb18284.x*

Singh, I., & Jha, A. (2013). Emotional intelligence and occupational stress among the faculty members of private medical and engineering colleges of Uttar Pradesh: A comparative study. *Advances in Management*, *3*(1), 222–233. http://doi.org/10.5964/ejop.v8i4.483*

Skaalvik, E. M. (1997). Self-enhancing and self-defeating ego orientation: Relations with task and avoidance orientation, achievement, self-perceptions, and anxiety. *Journal of Educational Psychology*, *89*(1), 71–81. http://doi.org/10.1037/0022-0663.89.1.71*

Skaalvik, E. M. (2002). Self-enhancing and self-defeating ego goals in mathematics lessons: Relationships among task and avoidance anxiety, and motivation (A Scientific Educology). *International Journal of Educology*, *16*(1), 54–76.

Soni, A., & Kumari, S. (2015). The role of parental math anxiety and math attitude in their children's math achievement. *International Journal of Science and Mathematics Education*. http://doi.org/10.1007/s10763-015-9687-5*

Spielberger, C. D., Gorsuch, R. L., & Lushene, R. E. (1970). *STAI manual for the state-trait anxiety inventory*. *Self-evaluation questionnaire*. California: Consulting Psychologists Press. Retrieved from papers3://publication/uuid/36197058-7045-4EDD-B5E1-8D20C4D309AF

Stanford, D., Dember, W. N., & Stanford, L. B. (1963). A children's form of the Alpert-Haber achievement anxiety scale. *Child Development*, *34*, 1027–1032.*

Stankov, L., Lee, J., Luo, W., & Hogan, D. J. (2012). Confidence: A better predictor of academic achievement than self-efficacy, self-concept and anxiety? *Learning and Individual Differences*, *22*(6), 747–758. http://doi.org/10.1016/j.lindif.2012.05.013*

Steinmayr, R., Crede, J., & Wirthwein, L. (2016). Subjective well-being, test anxiety, academic achievement: Testing for reciprocal effects. *Frontiers in Psychology*, *6*(January), 1–13. http://doi.org/10.3389/fpsyg.2015.01994*

Tianjian, W. (2010). Speaking anxiety: More of a function of personality than language achievement. *Chinese Journal of Applied Linguistics (Bimonthly)*, *33*(5), 96–112. Retrieved from http://content.ebscohost.com.proxy.cityu.edu/pdf25_26/pdf/2010/55P8/01Oct10/61059631.pdf?T=P&P=AN&K=61059631&S=R&D=ehh&EbscoContent=dGJyMNHr7ESep7Q4y9fwOLCmr0yeqK9Ss6q4SLaWxWXS&ContentCustomer=dGJyMPGrsVGvrrJIuePfgeyx44Dt6fIA*

Triandis, H. C., Bontempo, R., Villareal, M. J., Asai, M., & Lucca, N. (1988). Individualism and collectivism: Cross-cultural perspectives on self-ingroup relationships. *Journal of Personality and Social Psychology*, *54*(2), 323–38. http://doi.org/10.1037/0022-3514.54.2.323

Wachelka, D., & Katz, R. C. (1999). Reducing test anxiety and improving academic self-esteem in high school and college students with learning disabilities. *Journal of Behavior Therapy and Experimental Psychiatry*, *30*(3), 191–198. http://doi.org/10.1016/s0005-7916(99)00024-5

Weems, C. F., Scott, B. G., Taylor, L. K., Cannon, M. F., Romano, D. M., & Perry, A. M. (2013). A theoretical model of continuity in anxiety and links to academic achievement in disaster-exposed school children. *Development and Psychopathology*, *25*(3), 729–737. http://doi.org/10.1017/S0954579413000138*

Weinstein, L. (1968). The mother-child schema, anxiety, and academic achievement in elementary. *Child Development*, 257–264.*

Weston, M. S. (1958). *Arithmetic anxiety and attitude: Its relation to mental ability and achievement in tests*. Unpublished master thesis. New Haven State Teachers College, Connecticut.*

Whitt, S. G. (1989). *The responsiveness of mathematics achievement in Grade 8 to anxiety, confidence, sex, and prior mathematics achievement*. Unpublished master thesis. Memorial University of Newfoundland, Canada.*

Woodard, T. (2004). The effects of math anxiety on post-secondary developmental students as related to achievement, gender, and age. *Inquiry*, *9*(1), 1–5.*

Wu, S. S., Barth, M., Amin, H., Malcarne, V., & Menon, V. (2012). Math anxiety in second and third graders and its relation to mathematics achievement. *Frontiers in Psychology*, *3*(June). http://doi.org/10.3389/fpsyg.2012.00162*

Wu, S. S., Willcutt, E. G., Escovar, E., & Menon, V. (2013). Mathematics achievement and anxiety and their relation to internalizing and externalizing behaviors. *Journal of Learning Disabilities*, *47*(6), 503–514. http://doi.org/10.1177/0022219412473154*

Yamada, K., Kawata, Y., Nakajima, N., & Hirosawa, M. (2012). Relationship between state anxiety and success rate in game performance, coach's evaluation among Japanese university volleyball players. *Work*, *41*(Suppl. 1), 5764–5766. http://doi.org/10.3233/WOR-2012-0944-5764*

Yaratan, H., & Kasapoğlu, L. (2012). Eighth grade students' attitude, anxiety, and achievement pertaining to mathematics lessons. *Procedia—Social and Behavioral Sciences*, *46*, 162–171. http://doi.org/10.1016/j.sbspro.2012.05.087*

Yavuz, Ö. Y. (2013). *Benlik kurgulari intihar ve intihara yönelik tutumlar* (Yayımlanmamış Yüksek Lisans Tezi). Aydın, Adnan Menderes Üniversitesi.

Yeh, Y.-C., Yen, C.-F., Lai, C.-S., Huang, C.-H., Liu, K.-M., & Huang, I.-T. (2007). Correlations between academic achievement and anxiety and depression in medical students experiencing integrated curriculum reform. *The Kaohsiung Journal of Medical Sciences*, *23*(8), 379–386. http://doi.org/10.1016/S0257-5655(07)70001-9*

Yıldırım, İ., Gençtanırım, D., Yalçın, İ., & Baydan, Y. (2008). Academic achievement, perfectionism and social support as predictors of test anxiety. *Journal of Education*, *34*, 287–296.*

Yoğurtçu, K., & Yoğurtçu, G. (2013). Effect of learning anxiety of foreign language as Turkish on academic achievement. *Adıyaman Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, (11 (Special Issue of Turkish Teaching)), 1115–1158.*

Young, J. R., & Young, J. L. (2015). Anxious for answers: A meta-analysis of the effects of anxiety on African American K-12 students' mathematics achievement. *Journal of Mathematics Education at Teachers College*, *6*(2), 1–9.*

Yousefi, F., Talib, M. A., Mansor, M., Juhari, R., & Redzuan, M. (2010). The relationship between test-anxiety and academic achievement among Iranian adolescents. *Psychology in the Schools*, *30*(2002), 100–105.*

Yüksel, M., & Geban, Ö. (2015). Examination of science and math course achievements of vocational high school students in the scope of self-efficacy and anxiety. *Journal of Education and Training Studies*, *4*(1), 88–100. http://doi.org/10.11114/jets.v4i1.1090*

Zahn, T. P. (1960). Size estimate of pictures associated with success and failure as a function of manifest anxiety. *Journal of Abnormal and Social Psychology*, *61*(3), 457–462.*

Zakaria, E., & Nordin, N. M. (2008). The effects of mathematics anxiety on matriculation students as related to motivation and achievement. *Eurasia Journal of Mathematics, Science and Technology Education*, *4*(1), 27–30.*

Zare, H., Rastegar, A., & Hosseini, S. M. D. (2011). The relation among achievement goals and academic achievement in statistics: the mediating role of statistics anxiety and statistics self-efficacy. *Procedia—Social and Behavioral Sciences*, *30*, 1166–1172. http://doi.org/10.1016/j.sbspro.2011.10.227*

Chapter 6
The Effect of Self-efficacy on Student Achievement

Özkan Çikrıkci

6.1 Introduction

The most important outcome of educational activities can be considered as raising individuals who can keep pace with the requirements of the age and who can transform the behaviors which are necessary for the welfare of the society they live in into performance as well as contributing to their personal development. People attempt to achieve these gains through the educational programs from pre-school to higher education. Within the existing systems, individuals are classified according to an achievement scale. Raising a successful generation which will make a contribution to the welfare of the country and humanity is a common expectation of the educators, politicians and the community. From this perspective, achievement in education can be considered as an important parameter. Achievement is a positive expression of the activities that individuals display in accordance with their competencies. There are many factors affecting the achievement of students, such as self-regulation skills (Zimmerman 1990), meta-cognitive skills (Vrugt and Oort 2008), anxiety (Brook and Willoughby 2015), self-esteem (Trautwein et al. 2006), motivation (Meece et al. 2006), the locus of control (Shepherd et al. 2006), perfectionism (Nounopoulos et al. 2006) and learning styles (Komarraju et al. 2011). In addition to the above, another important variable which, according to educational studies, is linked with achievement is self-efficacy (Acun 2014; Caprara et al. 2011; Di Giunta et al. 2013; Hwang et al. 2016; Topkaya 2016a, b). The latter is a concept that is related to the belief of the individuals in their own competences and in exhibiting the behaviors that they have (Bandura 1977).

Bandura (1986) stated that individuals have a core (self) system allowing them to control their own feelings, ideas and behaviors and to make various regulations. This core system hosts the cognitive and affective structures of the individual, and it

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includes competencies such as symbolization, model-based learning, developing alternative strategies, behavior regulation and self-judgment (Pajares 1996). Self-efficacy is a crucial factor affecting individual qualification processes (Bandura 1989). Self-efficacy is related to the beliefs of individuals about their competence to bring their educational life and behaviors to the appropriate levels. Self-efficacy is knowing what the individual can do rather that what he has to do. In other words, it means that an individual transforms his performance into behavior by assessing his own abilities and competencies (Bandura 2001b).

According to Bandura, self-efficacy beliefs guide individuals' strategic, irregular, optimistic or pessimistic thinking in a direct way; they affect their motivation level at the point of shaping behaviors. In other words, individuals' behaviors can change as a result of the assessment of existing individual competencies. Perceived self-efficacy has a key role in the formation of human behaviors. Although the perceived self-efficacy does not affect the behavior directly it has a significant effect on its determinants such as goals, expectations, emotional tendencies, barriers and opportunities (Bandura 2000). On the basis of the above, it can be concluded that individuals' beliefs about their self-efficacy affects their motivation, emotions and behaviors. Therefore, questioning the competencies that allow individuals to make deductions is the core of doing. Self-efficacy theory discusses the origins of the beliefs about self-efficacy as well as the structure and functioning of these beliefs at both the individual and the collective level. A self-efficacy belief system can be integrated with different findings obtained from functional processes of human behavior and with social cognitive theory. As a result, it can be said that self-efficacy theory provides quite explicit instructions about how to improve individual skills (Bandura 1995).

Self-efficacy is a subjective judgment of individual competencies associated with the maintenance and regulation of goal-directed behaviors. It is interpreted as a belief system featuring what can be done better as well as self-judgments of the individuals about their physical and personality traits (Zimmerman and Cleary 2006). Bandura (1977, 1986) has examined academic qualification in various dimensions related to self-efficacy, namely level, generalizability, and power. The self-efficacy level is the variation in the difficulty level of particular tasks. The generalizability of self-efficacy can be explained by the fact that individuals can transfer their self-efficacy perceptions into different tasks and fields. The power of self-efficacy is associated with the level of certainty that the individual can accomplish a certain task. Solving complex mathematic problems is an example of self-efficacy level, whereas overcoming various academic problems is an example of the generalizability of self-efficacy (Zimmerman 2000).

On the basis of the theoretical approaches mentioned above, it can be said that there might be a bidirectional relationship between achievement and self-efficacy. Accordingly, the increase observed in the self-efficacy of the individuals is reflected positively to their achievement. This is because self-efficacy beliefs affect human behaviors in several ways. Firstly, it is argued that self-efficacy affects the selection of behaviors, meaning that the behaviors that an individual will exhibit are determined by his self-efficacy beliefs. In other words, individuals are affected from their self-efficacy perceptions while transforming their cognitive and affective competencies into performance. Therefore, it is quite likely that an individual who exhibits a cognitive and affective behavior with a positive expectation will complete the process successfully. Secondly, self-efficacy helps individuals to determine how much effort and time they should spend in order to handle an anxious situation. Regarding academic achievement, individuals can determine through self-efficacy the behaviors that they should exhibit in order to obtain the desired result (achievement) in tough experiences or situations (Kumar and Lal 2006).

This study investigated the effect of self-efficacy on student achievement. Additionally, the factors that are thought to affect the average effect size obtained in the study were set as moderators. These are *(i)* the publication year of the research, *(ii)* the publication type of the research, *(iii)* the country (culture) where the research was carried out, *(iv)* the course in which the achievement was measured and *(v)* the level of education.

6.2 Method

6.2.1 Study Design

In this study, the effect of self-efficacy on student achievement was tested with a meta-analysis design.

6.2.2 Review Strategy and Criteria for Inclusion/Exclusion

To determine the research studies to include in the meta-analysis, the Science-Direct, Proquest and Ebsco academic databases were used to conduct a literature review. For this process, the terms *self-efficacy* and *student achievement/ student success* included in the titles of the studies were used to screen the research studies. The end date for the research studies included in the research was identified as January 2016. Doctoral dissertations and peer-reviewed journals were included in the study.

Many strategies were used to identify the research studies that were appropriate for the meta-analysis of the study. First, a research study pool (943 research studies) was established; it included all studies with self-efficacy and student achievement/ success in their titles. The abstracts of these studies were reviewed, and all were found to be appropriate to include in the study. In the second stage, all research studies in the pool were examined in detail. The results of the examination found that 231 of the research studies in the pool were appropriate, and 712 were not found to be suitable. The descriptive statistics of the 231 research studies included in the analysis are presented in Table 6.1.

Table 6.1 Characteristics of the studies included in the meta-analysis

The years of the studies	*n*	%
2016–2012	110	47.6
2011–2007	66	28.6
2006–2002	27	11.7
2001–1997	13	5.6
1996–1992	12	5.2
1991–1987	3	1.3
Type of publication		
Dissertation	108	46.8
Article	123	53.2
Culture		
Vertical collectivist	80	34.6
Horizontal individualist	145	62.8
Not reported	6	2.6
School subject or assessment type		
Cumulative point average	109	47.2
English	14	6.1
Geometry	3	1.3
Language	7	3
Mathematic	54	23.4
Mechanics	3	1.3
Psychology	2	.9
Reading	13	5.6
Science	13	5.6
Social science	5	2.2
Statistics	2	.9
Writing	6	2.6
Sample group		
Primary School	24	10.4
Primary and Secondary School	5	2.2
Secondary School	42	18.2
Secondary and High School	4	1.7
High school	62	26.8
University	94	40.7

The criteria for inclusion of the research studies in the analysis study were identified as follows:

- To have the statistical information necessary for correlational meta-analysis (n and r, or R^2 values)
- To be a study measuring the correlation self-efficacy and student achievement/ success

Reasons for not including a research study in the meta-analysis:

- Having no quantitative data (qualitative research)
- Not having a correlation coefficient
- Not focusing on student achievement
- Not focusing on self-efficacy

6.2.3 Coding Process

The coding process was essentially a data sorting process used to ascertain which data were clear and suitable for the study. In this scope, a coding form was developed before the statistical analysis was conducted, and the coding was conducted according to the form. The main aim was to develop a specific coding system that allowed the study to see the entirety of the research studies in general and that would not miss any characteristics of each individual research study. The coding form developed in the study was comprised of:

- References for the research
- Sample information
- The years of the studies
- Type of publication
- Culture
- School subject or assessment type
  Sample group

6.2.4 Statistical Processes

The effect size acquired in meta-analysis is a standard measure value used in the determination of the strength and direction of the relationship in the study (Borenstein et al. 2009). Pearson's correlation coefficient (r) was determined to be the effect size in this study. Because the correlation coefficient has a value between *+1* and *−1,* the r value calculated was evaluated by converting this value into the value as it appears in the z table (Hedges and Olkin 1985a, b). Provided that more than one correlation value is given between the same structure categories in correlational meta-analysis studies, two different approaches are used in the determination of the one to be used in the meta-analysis (Borenstein et al. 2009; Kulinskaya et al. 2008). For this study, (*i*) first, if the correlations were independent, all the related correlations were included in the analysis and were considered to be independent studies, and (*ii*) if there were dependent correlations, then the *highest correlation value* was accepted. A *random effect model* was used for the meta-analysis processes in this study. The *Comprehensive Meta-Analysis* program was used in the meta-analysis process.

6.2.5 Moderator Variables

To determine the statistical significance of the differences between the moderators of the study, only the Q_b values were used. Five moderator variables that were expected to have a role in the average effect size were identified in the study. The first of these considered is the *years of the studies* as a moderator in regards to the relationship between self-efficacy and student achievement. The second is the *type of publication* which was thought to have a role on the average impact of self-efficacy on student achievement. The rest are the *culture*, *school subject or assessment type,* and *sample group*.

6.2.6 Publication Bias

A funnel plot for the research studies included in the meta-analysis of can be seen in Fig. 6.1. Evidence that publication bias affected the research studies included in the meta-analysis can be seen in Fig. 6.1. A serious asymmetry would be expected in the funnel plot if there were a publication bias. The concentration of plots on one side under the line of average effect size, particularly in the bottom section of the funnel, suggests the probability of a publication bias in the research studies. In this study, no evidence of partiality of the publications was observed in any of the 231 data subjected to meta-analysis.

Although no partiality in publications was observed in the funnel plot, the results of Duval and Tweedie's trim and fill test, which was applied to determine the effect of partiality in publications acquired with the meta-analysis using the random effect model, are given in Table 6.2. As is seen in Table 6.2, there is no difference between the effect observed and the artificial effect size created to fix the effect of the partiality of publications. The research on each side of the center line is

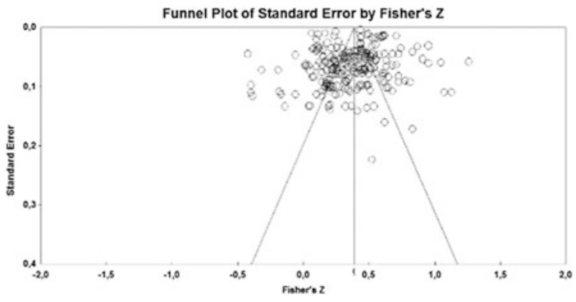

Fig. 6.1 Effect size funnel for publication bias

Table 6.2 Duval and Tweedie's trim and fill test results

	Excluded studies	Point estimate	CI (confidence interval)		*Q*
			Lower limit	Upper limit	
Observed values		0.3681	0.3646	0.3715	9116.03
Corrected values	0	0.3681	0.3646	0.3715	9116.03

symmetrical, and this is the indicator of non-difference. Because there is no evidence indicating lost data on either side of the center line, the difference between the fixed effect size and observed effect size is zero.

6.2.7 Findings

The results of the meta-analysis about the relationship between self-efficacy and student achievement are displayed in Table 6.3. The findings supported hypothesis H1 which stated that there is a positive relationship between self-efficacy and student achievement. The effect size of self-efficacy on student achievement was calculated as 0.34 which shows that self-efficacy has a medium level effect (see Cohen 1988) on student achievement.

The results supported hypothesis H2 which formulated that the publication year plays a moderator role in the effect size of self-efficacy on achievement ($Qb = 21.57$, $p < .01$). Accordingly, the effect of self-efficacy on achievement was at a medium level for studies conducted in the years 2012–2016 [$r = .38$], 2007–2011 [$r = .29$], 2002–2006 [$r = .27$], 1997–2001 [$r = .44$] and 1992–1996 [$r = .28$]. On the other hand, it was found that the effect of self-efficacy on achievement was not statistically significant for studies conducted between 1987 and 1991 [$r = .12$, $p > .05$].

Publication type is the second moderator variable analyzed in the study. The findings of the research supported hypothesis H3. The effect of self-efficacy on student achievement is at a medium level in the papers [$r = .38$] and theses [$r = .28$] included in the meta-analysis.

The culture where the research has been carried out was taken as another moderator variable. The findings supported hypothesis H4 which formulated that the culture where the research was carried out is a moderator ($Qb = 16.71$, $p < .001$). The effect of self-efficacy on achievement was found to be at a medium level in horizontal individualistic [$r = .31$] and vertical-collectivist [$r = .40$] cultures. Moreover, the effect of self-efficacy on achievement was found to be low [$r = .21$] for the studies for which there was no information about the culture where the research has been carried out ($N = 6$).

The courses in which the academic achievement of the students was calculated were also tested as moderator variable. The outcomes supported hypothesis H5 which formulated that the course in which the achievement was measured plays a

Table 6.3 Findings of the correlations between self-efficacy and student achievement: results of the meta-analysis

Variable	k	N	r	CI (confidence interval)		Q	Q_b
				Lower limit	Upper limit		
Self-efficacy	231	242023	.34*	.31	.36	9116.03*	
Moderator (the years of the studies)						21.57**	
2016–2012	110	181298	.38*	.35	.42		
2011–2007	66	48043	.29*	.24	.34		
2006–2002	27	7081	.27*	.19	.34		
2001–1997	13	4103	.44*	.34	.53		
1996–1992	12	1166	.28*	.16	.39		
1991–1987	3	332	.12	−.12	.36		
Moderator (publication type)						16.23*	
Article	123	104031	.38*	.35	.42		
Dissertation	108	137992	.28*	.24	.32		
Moderator (culture)						16.71*	
Horizontal Individualist	145	164255	.31*	.27	.34		
Vertical collectivist	80	76152	.40*	.36	.44		
Not reported	6	1616	.21***	.04	.36		
Moderator (school subject or assessment type)						20.71***	
CPA	109	130612	.29*	.25	.33		
English	14	6830	.37*	.27	.47		
Geometry	3	1576	.40**	.18	.58		
Language	7	2931	.47*	.34	.58		
Mathematic	54	86157	.40*	.35	.45		
Mechanics	3	1035	.42*	.21	.60		
Psychology	2	538	.41**	.13	.62		
Reading	13	2843	.26*	.14	.37		
Science	13	4814	.34*	.23	.44		
Social Science	5	3058	.40*	.24	.55		
Statistics	2	683	.38**	.11	.60		
Writing	6	946	.32*	.15	.47		
Moderator (sample group)						8.22	
Primary school	24	10838	.43*	.36	.50		
Primary and Secondary School	5	6246	.38*	.20	.53		
Secondary School	42	51671	.34*	.28	.40		
Secondary and High School	4	982	.33**	.12	.51		
High School	62	85001	.34*	0.29	.39		
University	94	87285	.31*	.27	.35		

$*p < .001$, $**p < .01$, $***p < .05$

moderator role in the effect of self-efficacy on student achievement ($Qb = 20.71$, $p < .05$). Accordingly, the effect of self-efficacy is at a medium level in the achievement of cumulative point average (CPA) [$r = .29$] and in language [$r = .37$], geometry [$r = .40$], foreign languages [$r = .47$], mathematics [$r = .40$], mechanic [$r = .42$], psychology [$r = .41$], science [$r = .34$], social sciences [$r = .40$], statistic [$r = .38$] and writing [$r = .32$] courses. The effect size of self-efficacy on reading achievement was found to be low [$r = .26$].

In this study the education levels in which the research was conducted were considered as the final moderator variable. The results of the moderator analysis did not support hypothesis H6 which stated that the level of education plays a moderator role in the effect of self-efficacy on student achievement ($Qb = 8.22$, $p > .05$). Although the effect size difference was not statistically significant the effect of self-efficacy on achievement was found to be at a medium level for all education levels: Primary School [$r = .43$], Primary and Secondary School [$r = .38$], Secondary School [$r = .34$], Secondary and High School [$r = .33$], High School [$r = .34$], University [$r = .31$]).

6.3 Conclusion

In this study, a meta-analysis was performed to determine the effect size of self-efficacy on achievement, and the findings obtained from the theses and articles which assessed the relationship between self-efficacy and achievement were evaluated. The publication year, publication type, the country (culture), the course in which the achievement was measured and the level of education were the variables that were considered as the moderator variables for the effect of self-efficacy on achievement.

The findings show that self-efficacy has a positive and significant effect on achievement which is a quite expected result. This identified effect is at a medium level. According to Bandura (1997), direct achievement experiences affect self-efficacy of the individuals directly. As mentioned before, the bidirectional interaction between self-efficacy and achievement is also the key of cumulative development. In other words, the achievement that the individual gets in one area affects positively the individual's self-efficacy perception towards similar experiences. Individuals, who possess a rational self-efficacy perception, may succeed in the future by using their potential more freely (Bandura 2001a). On the other hand, the self-efficacy perception of the individuals who have failed after various experiences is negatively affected. These individuals do not feel capable in certain areas and cannot use their capacity effectively. As a result of this process, the individual may fail (Bandura 2001b). In sum, a clear distinction in the interaction between self-efficacy and achievement cannot be made. It is argued that self-efficacy and achievement are the formations that continuously reinforce or block each other.

In order to examine the interaction between self-efficacy and achievement across years, the publication year of the studies included in the meta-analysis was taken as moderator variable. According to the findings, it can be seen that publication year is a significant moderator variable for the effect of self-efficacy on achievement. In other words, different results regarding the effect of self-efficacy on achievement can be obtained across different years. Indeed, the findings obtained from the heterogeneity analysis made in this study showed that the effect size of self-efficacy on achievement is bigger in the studies conducted between 1997 and 2001 compared to the effect size of the studies conducted in other years. Moreover, the effect of self-efficacy on achievement was found to be insignificant for the studies conducted between 1987 and 1991. This finding may be due to the low number of studies featuring the association between self-efficacy and achievement (k = 3) and the low sample size (N = 332). The overall overview across the years shows that the significant effect of self-efficacy on achievement, which is at a medium level, remains constant. It is an undeniable fact that all the developments that are happening in the world have reflections in educational environments. Experts argue that students' achievements in education can be increased through the development of relevant technology and its integration to education (MEB 2015; Tosuntaş et al. 2015). The increase in the use of technology in educational environments can be offered as a reason for the higher effect size of self-efficacy on achievement between 1997 and 2001. It is assumed that as a result of new approaches and practices affecting student achievement, students' self-efficacy perceptions were affected positively. The decline of the interaction between self-efficacy and achievement in the subsequent years can be explained by the uniform character of the educational environments over time.

Regarding the publication type, it was found that publication type plays a moderator role in the effect of self-efficacy on achievement. According to the findings, the effect of self-efficacy on achievement is at a medium level for the papers and theses. There are significant differences between theses and papers. The occurrence of significant differences between these publication types indicates that the relevant results for allow for differentiation. The majority of the studies included in this meta-analysis are papers which tend to result in higher values, whereas this concern is lower for theses. This fact, which is reflected in the clustering of the values at one side, is called "publication bias" in the literature (Borenstein et al. 2009). This study shows that the type of the analyzed studies creates a difference in the effect of self-efficacy on achievement. The moderator analysis shows that this interaction was found to be higher in the articles compared to theses.

The culture where the research was carried out (vertical-collectivist or horizontal-individualistic) was included as another moderator variable. The findings show that the culture where the research was carried out is a significant moderator for the effect of self-efficacy on achievement. Although these effect sizes are at a medium level the effect of self-efficacy on achievement was found to be higher in horizontal-individualistic communities. It is argued that individualistic communities are academically more successful (İlhan 2009). On the other hand, collectivist communities are more successful in finding solutions to problems (Yavuz 2013). It is believed that the self-efficacy perception of the individuals who live in horizontal-individualistic communities, where they have to struggle with challenging life conditions alone, would be more developed compared to the self-efficacy perception of individuals who live in collectivist communities. This is because, as expressed before, direct experiences are quite important for the development of self-efficacy and especially the accomplishment of achievement.

In this study the course in which the research was carried out was evaluated as another moderator variable. The findings showed that the course in which the research was carried out is indeed a moderator variable. The analysis of the interaction between self-efficacy and achievement across different courses indicates that the highest effect is observed in foreign language courses. Additionally, it was found that the interaction between self-efficacy and achievement was significant and at a medium level for all courses. This finding can be interpreted as an indicator that the self-efficacy perception of the individuals may be influential in various areas. In addition to the general self-efficacy perception, it is argued that self-efficacies developed in particular areas also support the development of self-efficacy perception in other areas. Thus, an individual who has succeeded in one area can associate this achievement with self-efficacy and can further his achievements by directing this self-efficacy perception to other areas.

The analysis showed that the level of education does not play a moderator role in the effect of self-efficacy on achievement. At the same time, the effect of self-efficacy on achievement was found to be significant and at a medium level at all education levels. In other words, even though the level of education is not a moderator for the effect of self-efficacy on achievement, there are various differentiations in all education levels. This finding shows that self-efficacy is a variable affecting achievement irrespective of the level of education.

Regarding the overall evaluation of the research findings, it can be said that self-efficacy is an important variable affecting achievement. The change observed in the self-efficacy perception of individuals is reflected accordingly to achievement (either positively or negatively). In this context, the adequate feedback of the educators, given in educational environments where students' personality is shaped through a rational orientation, may affect the self-efficacy of students positively. Indeed, they should be very careful while performing this activity. Underlining the performance of the students too much while making positive evaluations of their achievement may affect the development of self-efficacy negatively. For example, overemphasizing the performance that the student has showed for succeeding may cause an irrational and negative self-efficacy perception, such as "I am already insufficient, I can only succeed if I put too much effort". In this regard, both the educators and the parents should take proper care for the children to develop a healthy self-efficacy perception.

References

Note. "*" References marked with an asterisk indicate studies included in the meta–analysis. The in–text citations to studies selected for meta–analysis are not followed by asterisks.

Abulibdeh, E. S., & Hassan, S. S. S. (2011). E-learning interactions, information technology self efficacy and student achievement at the University of Sharjah, UAE. *Australasian Journal of Educational Technology*, *27*(6), 1014–1025.*

Acun, İ. (2014). Web-supported effective human rights, democracy and citizenship education? *Computers & Education, 70,* 21–28.

Adeyinka, T., Adedeji, T., & Olufemi, A. (2011). Locus of control, interest in schooling and self-efficacy as predictors of academic achievement among junior secondary school students in Osun State, Nigeria. *New Horizons in Education*, *59*(1), 25–38.*

Adnan, K., & Akbas, A. (2006). Affective factors that influence chemistry achievement (attitude and self efficacy) and the power of these factors to predict chemistry achievement-I. *Journal of Turkish Science Education*, *3*(1), 76–85.*

Afari, E., Ward, G., & Khine, M. S. (2012). Global self-esteem and self-efficacy correlates: Relation of academic achievement and self-esteem among Emirati students. *International Education Studies*, *5*(2), 49–57.*

Akbaş, A., & Kan, A. (2007). Affective factors that influence chemistry achievement (Motivation and anxiety) and the power of these factors to predict chemistry achievement-II. *Education Turkish Science*, *4*(1), 10–19.*

Al-Alwan, A. F. (2013). University students' epistemological beliefs, learning approaches, academic self-efficacy, and academic achievement. *Journal of Institutional Research South East Asia*, *11*(1), 58–67.*

Alivernini, F., & Lucidi, F. (2011). Relationship between social context, self-efficacy, motivation, academic achievement, and intention to drop out of high school: A longitudinal study. *The Journal of Educational Research*, *104*(4), 241–252.*

Altun, F., & Yazıcı, H. (2013). Ergenlerin benlik algılarının yordayıcıları olarak akademik öz-yeterlik inancı ve akademik başarı. *Kastamonu Eğitim Dergisi, 21*, 145–156.*

Altun, S., & Erden, M. (2013). Self-regulation based learning strategies and self-efficacy perceptions as predictors of male and female students' mathematics achievement. *Procedia - Social and Behavioral Sciences*, *106*, 2354–2364.*

Anjum, R. (2006). The impact of self-efficacy on mathematics achievement of primary school children. *Pakistan Journal of Psychological Research*, *21*, 61–78.*

Asakereh, A., & Dehghannezhad, M. (2015). Student satisfaction with EFL speaking classes: Relating speaking self-efficacy and skills achievement. *Issues in Educational Research*, *25*(4), 345–363.*

Awang-Hashim, R. (1999). *The effects of state and trait worry, self-efficacy and effort on statistics achievement of Malay and Chinese undergraduates in Malaysia: A causal modeling approach.* Unpublished Doctoral Dissertation, University of South California, USA.*

Awang-Hashim, R., O'Neil Jr, H. F., & Hocevar, D. (2002). Ethnicity, effort, self-efficacy, worry, and statistics achievement in Malaysia: A construct validation of the state-trait motivation model. *Educational Assessment*, *8*(4), 341–364.*

Aydoğan, D., & Özbay, Y. (2012). Akademik erteleme davranişinin benlik saygisi, durumluluk kaygi, öz-yeterlilik açisindan açiklanabilirliğinin incelenmesi. *Pegem Eğitim ve Öğretim Dergisi*, *2*(3), 1–10.*

Ayotola, A., & Adedeji, T. (2009). The relationship between mathematics self-efficacy and achievement in mathematics. *Procedia—Social and Behavioral Sciences*, *1*(1), 953–957.*

Azar, H. K., Lavasani, M. G., Malahmadi, E., & Amani, J. (2010). The role of self-efficacy, task value, and achievement goals in predicting learning approaches and mathematics achievement. *Procedia—Social and Behavioral Sciences*, *5*(2), 942–947.*

Baker, M. M. H. (2015). *The relationship of technology use with academic self-efficacy and academic achievement in urban middle school students.* Unpublished Doctoral Dissertation, Johnson & Wales University, USA.*

Bandura, A. (1986). *Social foundations of thought and action*. New Jersey: Prentice- Hall.

Bandura, A. (1989). Human agency in social cognitive theory. *American Psychologist, 44*(9), 1175–1184.

Bandura, A. (1995). Exercise of personal and collective efficacy in changing society. In B. Albert (Ed.), *Self-efficacy in changing societies* (pp. 1–45), Cambridge: Cambridge University Press.

Bandura, A. (2000). Exercise of human agency through collective efficacy. *Current Directions in Psychological Science, 9*(3), 75–78.

Bandura, A. (2001a). Social cognitive theory of mass communication. *Media Psychology, 3*(3), 265–299.

Bandura, A. (2001b). Social cognitive theory: An agenetic perspective. *Annual Review of Psychology, 52*(1), 1–26.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavior change. *Psychological Review, 84,* 191–215.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: W.H. Freeman and Company.

Basak, R., & Ghosh, A. (2014). Perception of mathematics self-efficacy and achievement of primary school students. *Journal of the Indian Academy of Applied Psychology*, *40*(1), 113–120.*

Becker, S. P. (2007). *Generalized perceived self-efficacy as a predictor of student success in a for-profit career college.* Unpublished Doctoral Dissertation, Johnson & Wales University, USA.*

Belin, C. J. (2011). *Ethnic identity, self-esteem, self-efficacy and satisfaction with life as determinants of sex differences in achievement among black adolescents.* Unpublished Doctoral Dissertation, The University of Arizona, USA.*

Bjørnebekk, G., Diseth, Å., & Ulriksen, R. (2013). Achievement motives, self-efficacy, achievement goals, and academic achievement at multiple stages of education: A longitudinal analysis. *Psychological reports*, *112*(3), 771–787.*

Borenstein, M., Hedges, L. V., Higgins, J. P. T., & Rothstein, H. R. (2009). *Introduction to meta-analysis*. UK: Wiley.

Brennan, M. (2015). *Exploring a complex model of student engagement in middle school: Academic self-efficacy beliefs and achievement.* Unpublished Doctoral Dissertation, Wayne State University, Detroit, Michigan.*

Briggs, C. (2014). *Mathematics, self-efficacy, identity, and achievement among African-American males from the high school longitudinal study*. Unpublished Doctoral Dissertation, Alabama State University, Alabama.*

Britner, S. L. (2002). *Science self-efficacy of African American middle school students: Relationship to motivation self-beliefs, achievement, gender and gender orientation.* Unpublished Doctoral Dissertation, Emory University, USA.*

Brook, C. A., & Willoughby, T. (2015). The social ties that bind: Social anxiety and academic achievement across the university years. *Journal of Youth and Adolescence, 44*(5), 1139–1152.

Brown, B. L. (2010). *The impact of self-efficacy and motivation characteristics on the academic achievement of upward bound participants.* Unpublished Doctoral Dissertation, University of Southern Mississippi, USA.*

Cacy, D. S. (1997). *The relationship between students' percieved self-efficacy on designated skills and their academic achievement in a third year family medicine clerkship* Unpublished Doctoral Dissertation, University of Oklahoma, Norman, Oklahoma.*

Cantrell, S. (2001). *Self-efficacy, causal attribution, self-esteem and academic success in baccalaurate nursing students.* Unpublished Doctoral Dissertation, Georgia State University, Demorest, Georgia.*

Caprara, G. V., Vecchione, M., Alessandri, G., Gerbino, M., & Barbaranelli, C. (2011). The contribution of personality traits and self-efficacy beliefs to academic achievement: A longitudinal study. *British Journal of Educational Psychology*, *81*(1), 78–96.*

Carroll, A., Houghton, S., Wood, R., Unsworth, K., Hattie, J., Gordon, L., & Bower, J. (2009). Self-efficacy and academic achievement in Australian high school students: The mediating effects of academic aspirations and delinquency. *Journal of Adolescence*, *32*(4), 797–817.*

Case, T., & From, S. (2012). The effects of high scientific literacy, self-efficacy, and achievement motivation on teachers' ability to compose effective tests: Case study from Manado, Indonesia. *Journal of College Teaching & Learning (TLC)*, *9*(4), 313–326.*

Cătălina, C. C., Stănescu, D. F., & Mohorea, L. (2012). Academic self-efficacy, emotional intelligence and academic achievement of Romanian students. Results from an exploratory study. *Journal of Educational Sciences and Psychology, 2*(1), 41–51.*

Cetin, B. (2013). Çoçuklar için öz-yeterlik ölçeğinin ilköğretim 4. ve 5. sinif öğrencilerinin akademik başarisini yordamasi. *Kastamonu Eğitim Dergisi, 21*(3), 1117–1132.*

Chang, Y. (2012). A study of fifth graders' mathematics self-efficacy and mathematical achievement. *Asia-Pacific Education Researcher, 21*(3), 519–525.*

Chang, Y. L. A. (2015). Examining relationships among elementary mathematics teachers' efficacy and their students' mathematics self-efficacy and achievement. *Eurasia Journal of Mathematics, Science & Technology Education*, *11*(6), 1307–1320.*

Chea, S. (2012). *The relationships among writing self-efficacy, writing goal orientation, learning strategies, and writing achievement.* Unpublished Master Dissertation, Northern Illinois University, Dekalb, Illinois.*

Cheema, J. R., & Kitsantas, A. (2014). Influences of disciplinary classroom climate on high school student self-efficacy and mathematics achievement: A look at gender and racial—ethnic differences. *International Journal of Science and Mathematics Education*, *12*(5), 1261–1279.*

Chen, Y. (2010). *Sources of mathematics self-efficacy and predictors of mathematics achievement among seventh and eighth-grade Taiwanese students.* Unpublished Doctoral Dissertation, University of Kentucky, Lexington, Kentucky.*

Cho, H. (2011). *The relationship of model minority stereotype, Asian cultural values and acculturation to goal orientation, academic self-efficacy and academic achievement in Asian American college students.* Unpublished Doctoral Dissertation, University of Southern California, USA.*

Choi, B. (1998). *A structural model of problem-solving ability, self-efficacy, effort, worry and achievement in calculus.* Unpublished Doctoral Dissertation, University of Southern California, USA.*

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Hillsdale, New Jersey: Lawrence Erlbaum Associates Publishers.

Cole, A. R. (2014). *Sports participation and academic achievement: Does self-efficacy play a role?* Unpublished Doctoral Dissertation, The University of Arizona, USA.*

Craft, S. A. (2006). *Ethnic differences in the relationship between self-efficacy, outcome expectations and academic achievement for first-year college students*. Unpublished Doctoral Dissertation, Duke University, USA.*

Cruz, L. L. (2001). *The influence of family support, acculturation, ethnic identity, and self-efficacy on the academic achievement of native Hawaiian-reared college students.* Unpublished Doctoral Dissertation, California State University, USA.*

Davisson, J. W. (1992). *Self-efficacy and academic success of integrated and segregated emotionally impaired adolescents.* Unpublished Doctoral Dissertation, Western Michigan University, Kalamazoo, Michigan.*

Defreitas, S. C. (2012). Differences between African American and European American first-year college students in the relationship between self-efficacy, outcome expectations, and academic achievement. *Social Psychology of Education*, *15*(1), 109–123.*

Defreitas, S. C., & Bravo, A. (2012). The influence of involvement with faculty and mentoring on the self-efficacy and academic achievement of African American and Latino college students. *Journal of the Scholarship of Teaching and Learning*, *12*(4), 1–11.*

Dentlinger, N. (2003). *Academic self-efficacy, prior academic success, demographic variables and academic success in first semester associate degree nursing coursework.* Unpublished Doctoral Dissertation, Oklahoma State University, Oklahoma.*

Denton, K. L. (1997). *The relation of children's self-efficacy beliefs and teacher beliefs about children's abilities and effort to first grade chidren's academic achievement.* Unpublished Doctoral Dissertation, University of Maryland, USA.*

Di Giunta, L., Alessandri, G., Gerbino, M., Luengo Kanacri, P., Zuffiano, A., & Caprara, G. V. (2013). The determinants of scholastic achievement: The contribution of personality traits, self-esteem, and academic self-efficacy. *Learning and Individual Differences*, *27*, 102–108.*

Diseth, A. (2011). Self-efficacy, goal orientations and learning strategies as mediators between preceding and subsequent academic achievement. *Learning and Individual Differences*, *21*(2), 191–195.*

Diseth, Å., Danielsen, A. G., & Samdal, O. (2012). A path analysis of basic need support, self-efficacy, achievement goals, life satisfaction and academic achievement level among secondary school students. *Educational Psychology*, *32*(3), 335–354.*

Doğan, N., Beyaztaş, D. İ., & Koçak, Z. (2012). Sosyal bilgiler dersine ilişkin özyeterlik düzeyinin başarıya etkisinin sınıf ve cinsiyete göre incelenmesi: Erzurum İli örneği. *Eğitim ve Bilim*, *37* (165), 224–237.*

Dunn, D. A. (2005). *The relationship of students' self-efficacy, attitudes toward science, perceptions of the laboratory environment and achievement with respect to the secondary science laboratory.* Unpublished Doctoral Dissertation, University of Southern California, USA.*

Dunn, D. J. (1989). *Learned resourcefulness, academic self-efficacy and academic achievement in traditional and reentry students.* Unpublished Doctoral Dissertation, Arizona State University, Arizona.*

Erdoğan, A., Baloğlu, M., & Kesici, Ş. (2011). Gender differences in geometry and mathematics achievement and self-efficacy beliefs in geometry. *Eurasian Journal of Educational Research, 43,* 91–106.*

Erkek, Ö., & Işiksal-Bostan, M. (2015). The role of spatial anxiety, geometry self-efficacy and gender in predicting geometry achievement. *Elementary Education Online*, *14*(1), 164–180.*

Feldman, D. B., & Kubota, M. (2015). Hope, self-efficacy, optimism, and academic achievement: Distinguishing constructs and levels of specificity in predicting college grade-point average. *Learning and Individual Differences*, *37*, 210–216.*

Fettahlioğlu, P., Güven, E., Elvan, İ. A., Çibik, A. S., & Aydoğdu, M. (2011). Fen bilgisi öğretmen adaylarinin fen öğretimine yönelik öz-yeterlik inançlarinin akademik başari üzerine etkisi. *Journal of Kirsehir Education Faculty*, *12*(3), 159–175.*

Flores, A. (2007). *Attributional style, self-efficacy and stress as predictors of academic success and academic satisfaction in college students.* Unpublished Doctoral Dissertation, The University of Utah. USA.*

Funk, T. A. (2009). *Identification of academic and social expectation anxieties and self-efficacy issues experienced by non-traditional students and examination of their effects on academic success.* Unpublished Doctoral Dissertation, TUI University, California.*

Gaythwaite, E. S. (2006). *Metacognition self-regulation, self-efficacy for learning and performance and critical thinking as predictors of academic success and course retention among community college students enrolled in online, telecourse and traditional public speaking courses.* Unpublished Doctoral Dissertation, University of Central Florida, Orlando, Florida.*

Gold, J. G. (2010). *The relationship between self-efficacy and achievement in at-risk high school students.* Unpublished Doctoral Dissertation, Walden University, California.*

Gordon, D. (2012). *The relationship between self-efficacy, help-seeking behaviors and student achievement among middle level mathematics students in an interactive learning environment.* Unpublished Doctoral Dissertation, Trident University International, California.*

Greene, G. L. (1999). *Writing self-efficacy, gender, aptitude and writing achievement among freshman university students.* Unpublished Doctoral Dissertation, The University of Alabama, Alabama.*

Gutiérrez-Braojos, C. (2015). Future time orientation and learning conceptions: effects on metacognitive strategies, self-efficacy beliefs, study effort and academic achievement. *Educational Psychology*, *35*(2), 192–212.*

Hafner, E. W. (2008). *The relationship between math anxiety, math self-efficacy and achievement among a sample of eighth grade students.* Unpublished Doctoral Dissertation, Capella University, USA.*

Hampton, N. Z. (1996). *The relationship of learning disabilities to the sources of self-efficacy, efficacy expectations and academic achievement in high school students.* Unpublished Doctoral Dissertation, University of Kentucky, USA.*

Hampton, N. Z., & Mason, E. (2003). Learning disabilities, gender, sources of efficacy, self-efficacy beliefs, and academic achievement in high school students. *Journal of School Psychology*, *41*(2), 101–112.*

Hedges, L. V., & Olkin, I. (1985). *Statistical method for meta-analysis*. United Kingdom: Academic Press.

Hejazi, E., Shahraray, M., Farsinejad, M., & Asgary, A. (2009). Identity styles and academic achievement: Mediating role of academic self-efficacy. *Social Psychology of Education*, *12*(1), 123–135.*

Helm, S. (1994). *The relationship between self-efficacy, locus of control, spirituality, personal characteristics and academic success of African-Americanyoung adults.* Unpublished Doctoral Dissertation, The University of Michigan, USA.*

Hemmingsen, S. D. (2001). *The career connection: A study of career self-efficacy, academic achievement and educational development in eleventh grade students.* Unpublished Doctoral Dissertation, University of Missouri, Kansas City.*

Hodge, M. B. (1997). *The effects of gender, math self-efficacy, test anxiety and previous math achievement on posology errors of baccalaureate nursing students.* Unpublished Doctoral Dissertation, University of Southern California, USA.*

Honea, J. W. (2002). *The effect of student diligence, diligence support systems, self-efficacy and locus of control on academic achievement.* Unpublished Doctoral Dissertation, Tennessee State University, USA.*

Hoover, K. G. (2000). *The relation of locus of control and self-efficacy to academic achievement of college freshmen.* Unpublished Doctoral Dissertation, Saint Louis University, USA.*

Hoppa, M. E. (2012). *Correlational study of the variables of self-esteem, self-efficacy and academic success in a population of native American students.* Unpublished Doctoral Dissertation, Capella University, USA.*

Horn, C. A. (1993). *An exploration of the effects of general ability, mastery goal orientation, self-efficacy and elaborative strategy use on student achievement and constructions of domain knowledge in introductory biology.* Unpublished Doctoral Dissertation, University of Nebraska, USA.*

Horner, T. M. (2014). *Academic success of first year students: The effects of alcohol expectancy and academic self-efficacy.* Unpublished Doctoral Dissertation, Indiana University of Pennsylvania, USA.*

Howe, S. M. (2013). *Academic accommodations, social supports and academic self-efficacy: Predictors of academic success for postsecondary students with disabilities.* Unpublished Doctoral Dissertation, University of Northern Colorado, Colorado.*

Huang, D. (1996). *The role of parental expectation, effort and self-efficacy in the achievement of high and low track high school students in Taiwan.* Unpublished Doctoral Dissertation, University of Southern California, USA.*

Hwang, M. H., Choi, H. C., Lee, A., Culver, J. D., & Hutchison, B. (2016). The relationship between self-efficacy and academic achievement: A 5-year panel analysis. *The Asia-Pacific Education Researcher*, *25*(1), 89–98.*

İlhan, T. (2009). *The self-concordance model of university students: Life goals, basic need satisfaction, and subjective well-being*. Unpublished Doctoral Dissertation, Gazi University, Turkey.

Iovu, M. B., Runcan, P., & Runcan, R. (2015). A study of the attitudes, self-efficacy, effort and academic achievement of social work students towards research methods and statistics: A diachronic approach. *Revista de Asistenta Sociala*, *1*, 103–114.*

Jackson, S. F. J. (2012). *Self-regulated and communal learning contexts as they relate to math achievement and math self-efficacy among African American elementary level students.* Unpublished Doctoral Dissertation, Howard University, USA.*

Jeffreys, M. R. (1993). *The relationship of self-efficacy and select academic and environmental variables on academic achievement and retention*. Unpublished Doctoral Dissertation, Columbia University Teachers College, USA.*

Jeng, Y. C., & Shih, H. H. (2008). A study of the relationship among self-efficacy, attribution, goal setting, and mechanics achievement in department of mechanical engineering students on Taiwan. *Proceedings of World Academy of Science: Engineering & Technology*, *47*, 532–538.*

Jimenez-Camargo, L. A. (2011). *Does ethnıcıty ımpact academıc success? Examınatıon of ethnıc ıdentıty medıatıon on academıc self-efficacy and academıc achıevement.* Unpublished Doctoral Dissertation, The University of Alabama, USA.*

Jones, J. R. (2014). *College self-efficacy and campus climate perceptions as predictors of academic achievement in African American males at community colleges in the State of Ohio*. Unpublished Doctoral Dissertation, The University of Toledo, USA.*

Kahraman, A. (2012). Prospective Elt teacher's sense of writing self-efficacy and its effects on writing achievement. *Procedia—Social and Behavioral Sciences*, *46*(1998), 711–714.*

Kalaycıoğlu, D. B. (2015). The influence of socioeconomic status, self-efficacy, and anxiety on mathematics achievement in England, Greece, Hong Kong, the Netherlands, Turkey, and the USA. *Kuram ve Uygulamada Egitim Bilimleri*, *15*(5), 1391–1401.*

Kaniskan, R. B. (2007). *Mediating effects of mathematics self-efficacy and adolescents' motivation towards schooling on the relationship between parental involvement and mathematics achievement.* Unpublished Doctoral Dissertation, Kent State University, USA.*

Karaglani, A. H. (2001). *Examining the relationship between writing self-efficacy, writing performance and general achievement for third grades*. Unpublished Doctoral Dissertation, University of Southern California, USA.*

Karataş, K., & Başbay, M. (2014). Predicting self-directed learning readiness level in terms of critical thinking disposition, general self-efficacy and academic achievement. *Elementary Education Online*, *13*(3), 916–933.*

Khan, A., Rahim Hamdan, A., Ahmad, R., & Mustaffa, M. S. (2015). International students academic achievement: Contribution of gender, self-efficacy and socio-cultural adjustment. *Asian Social Science*, *11*(10), 153–158.*

Kirmizi, Ö. (2015). The interplay among academic self-concept, self-efficacy, self-regulation and academic achievement of higher education L2 learners. *Journal of Higher Education & Science/Yüksekögretim ve Bilim Dergisi*, *5*(1), 32–40.*

Kitsantas, A., Cheema, J., & Ware, H. W. (2011). Mathematics achievement: The role of homework and self-efficacy beliefs. *Journal of Advanced Academics*, *22*(2), 310–339.*

Komarraju, M., & Nadler, D. (2013). Self-efficacy and academic achievement: Why do implicit beliefs, goals, and effort regulation matter? *Learning and Individual Differences*, *25*, 67–72.*

Komarraju, M., Karau, S. J., Schmeck, R. R., & Avdic, A. (2011). The big five personality traits, learning styles, and academic achievement. *Personality and Individual Differences, 51*(4), 472–477.

Köseoğlu, Y. (2015). Self-efficacy and academic achievement—A case from Turkey. *Journal of Education and Practice, 6*(29), 131–141.*

Krawchuk, L. L. (2008). *Procrastination, self-efficacy calibration, anxiety, and achievement in undergraduate students*. Unpublished Doctoral Dissertation, University of Alberta, Canada.*

Ku, N-K. (1999). A *study of the relationships among self-efficacy, attribution for effort, and academic achievement for Asian and non-Asian fifth-grade students.* Unpublished Doctoral Dissertation, California State University, USA.*

Kulinskaya, E., Morgenthaler, S., & Staudte, R. G. (2008). *Meta analysis: A guide to calibrating and combining statistical evidence*. John Wiley & Sons.

Kumar, R., & Lal, R. (2006). The role of self-efficacy and gender difference among the adolescents. *Journal of the Indian Academy of Applied Psychology, 32*(3), 249–254.

Lacap, M. K. (1990). *Effects of goal-setting and self-efficacy on the effort and algebra achievement of high school students.* Unpublished Doctoral Dissertation, The Florida State University, USA.*

Landine, J. R. (1994). R*elationship between metacognitive approaches, and motivation, locus of control, self-efficacy, and academic achievement*. Unpublished Doctoral Dissertation, University of New Brunswick, Canada.*

Larrain, R. F. (2016). *High school students' mathematics self-efficacy and achievement: Considering ethnicity and school belonging*. Unpublished Doctoral Dissertation, Fordham University, USA.*

Lee, J. Y. (2012). *The relationship between perceptions of self-efficacy, classroom practices, parental involvement, and student achievement among low income African American middle school students*. Unpublished Doctoral Dissertation, Howard University, USA.*

Lee, J., Bong, M., & Kim, S. (2014). Interaction between task values and self-efficacy on maladaptive achievement strategy use. *Educational Psychology*, *34*(5), 538–560.*

Lee, J.-J. (2004). *Taiwanese students' scientific attitudes, environmental perceptions, self-efficacy, and achievement in microbiology courses.* Unpublished Doctoral Dissertation, University of South Dakota, USA.*

Lee, O., & Luykx, A. (2007). The challenge of altering elementary school teachers' beliefs and practices regarding linguistic and cultural diversity in science instruction. *Journal of Research in Science Teaching*, *44*(9), 1269–1291.*

Lee, W., Lee, M. J., & Bong, M. (2014). Testing interest and self-efficacy as predictors of academic self-regulation and achievement. *Contemporary Educational Psychology*, *39*(2), 86–99.*

Liem, A. D., Lau, S., & Nie, Y. (2008). The role of self-efficacy, task value, and achievement goals in predicting learning strategies, task disengagement, peer relationship, and achievement outcome. *Contemporary Educational Psychology*, *33*(4), 486–512.*

Liew, J., McTigue, E. M., Barrois, L., & Hughes, J. N. (2008). Adaptive and effortful control and academic self-efficacy beliefs on achievement: A longitudinal study of 1st through 3rd graders. *Early Childhood Research Quarterly*, *23*(4), 515–526.*

Lindsay, P. C. (2010). *Assessing the relationships among goal orientation, test anxiety, self-efficacy, metacognition, and academic performance.* Unpublished Doctoral Dissertation, Northern Illınois University, USA.*

Lyons-Shenk, T. (2007). *Academic self-efficacy and college achievement: Similarities and differences as a function of family educational background and age.* Unpublished Doctoral Dissertation, The State University of New York, USA.*

Magnano, P., Ramaci, T., & Platania, S. (2014). Self-efficacy in learning and scholastic success: Implications for vocational guidance. *Procedia—Social and Behavioral Sciences*, *116*, 1232–1236.*

Malpass, J. R., O'Neil, H. F., & Hocevar Jr, D. (1999). Self-regulation, goal orientation, self-efficacy, worry, and high-stakes math achievement for mathematically gifted high school students 1, 2. *Roeper Review*, *21*(4), 281–288.*

Martinez, J. R. (2003). *Academic locus of control, achievement motivation and academic self-efficacy: Predicting academic achievement in hispanic and non-hispanic middle school children.* Unpublished Doctoral Dissertation, California State University, USA.*

MEB-Milli Egitim Bakanlığı. (2015). *Egitimde FATİH projesi*. Retrieved from http://fatihprojesi.meb.gov.tr/tr/icerikincele.php?id¼6

Meece, J. L., Anderman, E. M., & Anderman, L. H. (2006). Classroom goal structure, student motivation, and academic achievement. *Annual Review of Psychology, 57,* 487–503.

Mejia Arias, E. E. (2006). *The relationship of perceived parent and family support, support of university environment, and academic self-efficacy on the academic achievement of latino college students.* Unpublished Doctoral Dissertation, New York University, USA.*

Meuschke, D. M. (2005). *The relationship between goal-orientation, help-seeking, math self-efficacy, and mathematics achievement in a community college.* Unpublished Doctoral Dissertation, University of Southern California, USA.*

Micucci, K. H. (2014). *Achievement, school integration, and self-efficacy in single-sex and coeducational parochial high schools.* Unpublished Doctoral Dissertation, Fordham University, USA.*

Migray, K. (2002). T*he relationships among math self-efficacy. Academic selfconcept and math achievement.* Unpublished Doctoral Dissertation, Arizona State University, USA.*

Mills, N. (2004). *Self-efficacy of college intermediate French students: Relation to motivation, achievement, and proficiency.* Unpublished Doctoral Dissertation, Emory University, USA.*

Mills, N., Pajares, F., & Herron, C. (2007). Self-efficacy of college intermediate French students: Relation to achievement and motivation. *Language Learning*, *57*(3), 417–442.*

Moghari, E. H., Lavasani, M. G., Bagherian, V., & Afshari, J. (2011). Relationship between perceived teacher's academic optimism and English achievement: Role of self-efficacy. *Procedia—Social and Behavioral Sciences*, *15*, 2329–2333.*

Mohammadyari, G. (2012). Comparative Study of relationship between general perceived self-efficacy and test anxiety with academic achievement of male and female students. *Procedia—Social and Behavioral Sciences*, *69*, 2119–2123.*

Morony, S., Kleitman, S., Lee, Y. P., & Stankov, L. (2013). Predicting achievement: Confidence versus self-efficacy, anxiety, and self-concept in Confucian and European countries. *International Journal of Educational Research*, *58*, 79–96.*

Nounopoulos, A., Ashby, J. S., & Gilman, R. (2006). Coping resources, perfectionism, and academic performance among adolescents. *Psychology in the Schools, 43*(5), 613–622.

Özkan, E., & Yildirim, S. (2013). The relationships between geometry achievement, geometry self-efficacy, parents' education level and gender*. *Egitim Bilimleri Fakultesi Dergisi*, *46*(2), 249–261.*

Pajares, F. (1996). Self-efficacy beliefs in academic settings. *Review of Educational Research, 66* (4), 543–578.

Pantel, S. J. (2008). *The role and function of anxiety, self-efficacy, and resource management strategies on academic achievement in university students.* Unpublished Doctoral Dissertation, University of Toronto, Canada.*

Parker, P. D., Marsh, H. W., Ciarrochi, J., Marshall, S., & Abduljabbar, A. S. (2014). Juxtaposing math self-efficacy and self-concept as predictors of long-term achievement outcomes. *Educational Psychology*, *34*(1), 29–48.*

Payne, R. H. (2011). *Influence of self-efficacy, locus of control, and computer competency on student success in foundational nursing course.* Unpublished Doctoral Dissertation, Touro University, USA.*

Phan, H. P. (2012). Informational sources, self-efficacy and achievement: a temporally displaced approach. *Educational Psychology*, *32*(6), 699–726.*

Phan, H. P. (2014). Self-efficacy, reflection, and achievement: A short-term longitudinal examination. *The Journal of Educational Research*, *107*(2), 90–102.*

Putwain, D., Sander, P., & Larkin, D. (2013). Academic self-efficacy in study-related skills and behaviours: Relations with learning-related emotions and academic success. *British Journal of Educational Psychology*, *83*(4), 633–650.*

Raman, J. (2010). N*ursing faculty support and nursing student general self-efficacy, math self-concept, affective commitment to the nursing program, barriers to success, and their academic achievement.* Unpublished Doctoral Dissertation, Dowling College, USA.*

Randall, A. K. L. (2008). *The effect of reading self-efficacy, expectancy-value, and metacognitive self-regulation on the achievement and persistence of community college students enrolled in basic skills reading courses.* Unpublished Doctoral Dissertation, University of Southern California, USA.*

Rastegar, A., Jahromi, R. G., Haghighi, A. S., & Akbari, A. R. (2010). The relation of epistemological beliefs and mathematics achievement: The mediating role of achievement goals, mathematics self-efficacy, and cognitive engagement. *Procedia—Social and Behavioral Sciences*, *5*(2), 791–797.*

Ratliff, E. (2014). *Relationship of self-efficacy in community college students from critical need areas with first semester academic achievement*. Unpublished Doctoral Dissertation, The University of Mississippi, USA.*

Reed, M. C. (2003). *The relation of neighborhood variables, parental monitoring, and school self-efficacy on academic achievement among urban African American girls*. Unpublished Doctoral Dissertation, Virginia Commonwealth University, USA.*

Rees, S. (2016). *A correlational study of self-efficacy and academic achievement of first semester college students enrolled in developmental courses.* Unpublished Doctoral Dissertation, Capella University, USA.*

Reid, K. W. (2007). *Black gold: understanding the relationships between racial identity, self-efficacy, institutional integration and academic achievement of black males in research universities.* Unpublished Doctoral Dissertation, Harvard University, USA.*

Reid, K. W. (2013). Understanding the relationships among racial identity, self-efficacy, institutional integration and academic achievement of black males attending research universities. *The Journal of Negro Education*, *82*(1), 75–93.*

Riconscente, M. M. (2014). Effects of perceived teacher practices on latino high school students' interest, self-efficacy, and achievement in mathematics. *The Journal of Experimental Education*, *82*(1), 51–73.*

Roberts, W. S. (2013). A*cademic achievement and self-efficacy among diverse populations.* Unpublished Doctoral Dissertation, The University of West Florida, USA.*

Robinson, P. L. (2006). P*redicting freshmen college success: the relationship between peer learning, help seeking, math self-efficacy, English self-efficacy and institutional integration.* Unpublished Doctoral Dissertation, University of Southern California, USA.*

Sadi, Ö., Uyar, M. (2013). Learning strategies and achievement : A path Education. *Journal of Baltic Science Education*, *12*(1), 21–34.*

Schyns, B., & Schilling, J. (2013). How bad are the effects of bad leaders? A meta-analysis of destructive leadership and its outcomes. *The Leadership Quarterly, 24*(1), 138–158.

Sha, L., Schunn, C., Bathgate, M., & Ben-Eliyahu, A. (2015). Families support their children's success in science learning by influencing interest and self- efficacy. *Journal of Research in Science Teaching*, *53*(3), 450–472.*

Shabazz, K. M. (2007). *The effects of environment and age on locus of control, self-efficacy, and self-esteem of military and non-military students'academic achievement.* Unpublished Doctoral Dissertation, Touro University, USA.*

Shepherd, S., Owen, D., Fitch, T. J., & Marshall, J. L. (2006). Locus of control and academic achievement in high school students. *Psychological reports*, *98*(2), 318–322.*

Sins, P. H. M., van Joolingen, W. R., Savelsbergh, E. R., & van Hout-Wolters, B. (2008). Motivation and performance within a collaborative computer-based modeling task: Relations between students' achievement goal orientation, self-efficacy, cognitive processing, and achievement. *Contemporary Educational Psychology*, *33*(1), 58–77.*

Skaalvik, E. M., Federici, R. A., & Klassen, R. M. (2015). Mathematics achievement and self-efficacy: Relations with motivation for mathematics. *International Journal of Educational Research*, *72*, 129–136.*

Speight, N. P. (2009). T*he relationship between self-efficacy, resilience and academic achievement among African-American urban adolescent students*. Unpublished Doctoral Dissertation, Howard University, USA.*

Spence, D., & Usher, E. (2007). Engagement with mathematics courseware in traditional and online remedial learning environments: Relationship to self-efficacy and achievement. *Journal of Educational Computing Research*, *37*(3), 267–288.*

Stanford, S. J. (2015). *The relationship between Yemeni students' attitudes on gender role and self-efficacy as related to academic achievement*. Unpublished Doctoral Dissertation, Trident University, USA.*

Stankov, L., & Lee, J. (2014). Quest for the best non-cognitive predictor of academic achievement. *Educational Psychology: An International Journal of Experimental Educational Psychology*, *34*(1), 1–8.*

Stevens, T. A. (2000). *Inherent factors and mathematics achievement: The mediating effects of mathematics self-efficacy and motivational orientation.* Unpublished Doctoral Dissertation, Texas Tech University, USA.*

Suphi, N., & Yaratan, H. (2012). Effects of learning approaches, locus of control, socio-economic status and self-efficacy on academic achievement: A Turkish perspective. *Educational Studies*, *38*(4), 419–431.*

Tang, N. Y. Y., & Westwood, P. (2007). Worry, general self-efficacy and school achievement: An exploratory study with Chinese adolescents. *Australian Journal of Guidance and Counselling*, *17*(01), 68–80.*

Taylor, J. S. (2012). *The relationship between college student success and the student's degree of perceived self-efficacy, career focus, and sense of life calling or purpose.* Unpublished Doctoral Dissertation, Union University School of Education, USA.*

Tilfarlioglu, F. T., & Cinkara, E. (2009). Self-efficacy in EFL: Differences among proficiency groups and relationship with success. *Novitas-ROYAL*, *3*(2), 129–142.*

Tilfarlioglu, F. Y., & Ciftci, F. S. (2011). Supporting self-efficacy and learner autonomy in relation to academic success in EFL classrooms (a case study). *Theory and Practice in Language Studies*, *1*(10), 1284–1294.*

Topkaya, Y. (2016a). The effect of teaching practice lessons on social studies teachers' self-efficacy perceptions. *Anthropologıst, 23*(1–2), 236–244.

Topkaya, Y. (2016b). The opinions of social studies teachers regarding value transfer approaches: A qualitative study. *Journal of Kirsehir Education Faculty, 17,* 637–652.

Tosuntaş, Ş. B., Karadağ, E., & Orhan, S. (2015). The factors affecting acceptance and use of interactive whiteboard within the scope of FATIH project: A structural equation model based on the Unified Theory of acceptance and use of technology. *Computers & Education, 81,* 169–178.

Trautwein, U., Lüdtke, O., Köller, O., & Baumert, J. (2006). Self-esteem, academic self-concept, and achievement: how the learning environment moderates the dynamics of self-concept. *Journal of Personality and Social Psychology, 90*(2), 334.

Vittorio, G., Barbaranelli, C., Steca, P., & Malone, P. S. (2006). Teachers' self-efficacy beliefs as determinants of job satisfaction and students' academic achievement. *A study at the school level*, *44*, 473–490.*

Vogt, K. E. (2005). *Asian American women in science, engineering, and mathematics: Background contextual and college environment influences on self-efficacy and academic achievement.* Unpublished Doctoral Dissertation, University of Maryland, USA.*

Vrugt, A., & Oort, F. J. (2008). Metacognition, achievement goals, study strategies and academic achievement: Pathways to achievement. *Metacognition and Learning, 3*(2), 123–146.

Weiser, D. A., & Riggio, H. R. (2010). Family background and academic achievement: Does self-efficacy mediate outcomes? *Social Psychology of Education*, *13*(3), 367–383.*

Wesley, J. W. (2002). *A study of academic achievement, attitude, motivation, general self-efficacy, and selected demographic characteristics of community college students.* Unpublished Doctoral Dissertation, Mississippi State University, USA.*

Wey, S.-C. (1998). *The effects of goal orientations, metacognition, self-efficacy and effort on writing achievement*. Unpublished Doctoral Dissertation, University of Southern California, USA.*

Wu, P.-C. (2006). *The effects of goal orientation, self-efficacy, and cognitive/metacognitive self-regulatory strategy use on EFL college students' course achievement.* Unpublished Doctoral Dissertation. University of Southern California, USA.*

Yarahmadi, Y. (2012). The relationship between perceptions of support of family, teachers, friends, and self-efficacy beliefs with academic achievement. *Education Sciences & Psychology*, *21*(2), 68–73.*

Yaratan, H., & Suphi, N. (2012). Impact of self-efficacy and learning approaches on achievement controlling for demographic variables. *Hacettepe University Journal of Education*, Special Issue (2), 232–243.*

Yavuz, Ö. Y. (2013). *Benlik kurgulari intihar ve intihara yönelik tutumlar*. (Yayımlanmamış Yüksek Lisans Tezi). Aydın, Adnan Menderes Üniversitesi, Turkey.

Yildirim, S. (2011). Self-efficacy, intrinsic motivation, anxiety and mathematics achievement : Findings from Turkey, Japan and Finland. *Necatibey Faculty of Education Electronic Journal of Science and Mathematics Education*, *5*(1), 277–291.*

Yilmaz, E., Yiğit, R., & Kaşarci, İ. (2012). İlköğretim öğrencilerinin özyeterlilik düzeylerinin akademik başari ve bazi değişkinler açisindan incelenmesi. *Mehmet Akif Ersoy Üniversitesi Eğitim Fakültesi Dergisi*, *1*(23), 371–388.*

Yogurtcu, K. (2013). The impact of self-efficacy perception on reading comprehension on academic achievement. *Akdeniz Language Studies Conference*, *70*, 375–386.*

Yusuf, M. (2011). The impact of self-efficacy, achievement motivation, and self-regulated learning strategies on students' academic achievement. *Procedia—Social and Behavioral Sciences*, *15*, 2623–2626.*

Zajacova, A., Lynch, S. M., & Espenshade, T. J. (2005). Self-efficacy, stress, and academic success in college. *Research in Higher Education*, *46*(6), 677–706.*

Zare, H., Rastegar, A., & Hosseini, S. M. D. (2011). The relation among achievement goals and academic achievement in statistics: the mediating role of statistics anxiety and statistics self-efficacy. *Procedia—Social and Behavioral Sciences*, *30*, 1166–1172.*

Zhang, X. (1994). *Self-efficacy, outcome value and attribution beliefs in a structural model of college students' engagement and achievement in foreign language learning*. Unpublished Doctoral Dissertation. The Florida State University, USA.*

Zimmerman, B. J. (1990). Self-regulated learning and academic achievement: An overview. *Educational Psychologist, 25*(1), 3–17.

Zimmerman, B. J. (2000). Self-efficacy: An essential motive to learn. *Contemporary Educational Psychology, 25*(1), 82–91.

Zimmerman, B. J., & Cleary, T. J. (2006). Adolescents' development of personal agency: The role of self-efficacy beliefs and self-regulatory skill. In P. Frank, & U. Tim (Eds.), *Self-efficacy beliefs of adolescents* (pp. 45–69). Greenwich: Information Age Publishing.

Zimmerman, B. J., & Kitsantas, A. (2005). Homework practices and academic achievement: The mediating role of self-efficacy and perceived responsibility beliefs. *Contemporary Educational Psychology*, *30*(4), 397–417.*

Zuffiano, A., Alessandri, G., Gerbino, M., Luengo Kanacri, B. P., Di Giunta, L., Milioni, M., & Caprara, G. V. (2013). Academic achievement: The unique contribution of self-efficacy beliefs in self-regulated learning beyond intelligence, personality traits, and self-esteem. *Learning and Individual Differences*, *23*(1), 158–162.*

Chapter 7
The Effect of Self-concept on Student Achievement

Sabiha Dulay

7.1 Introduction

Individuals who appear to be similar to each other may have different thoughts about themselves and may exhibit different behaviors depending on how they perceive themselves and on their beliefs about what they can achieve (Bong and Skaalvik 2003). This belief of the individuals about their personality, roles, skills and relationships with other individuals is called self-concept. In the most general sense, self-concept refers to people's perceptions about themselves. There are different conceptualizations of self-concept in the literature. McInerney et al. (2012) emphasized the way individuals perceive their own strength and weaknesses, skills, attitudes and values, whereas Wang and Lin (2008) considered self-concept as a sense of confidence that individuals feel about themselves and as an important factor for predicting success or failure in academic duties. In this context, self-concept is related to individuals' personal perceptions about their own academic abilities or skills, it is usually developed through experience and through an interpretation of the learning environment, and it is seen as one of the most important factors in learning (Marsh and Martin 2011). Shavelson et al. (1976) have divided self-concept into two categories: academic self-concept and non-academic self-concept. Based on this, they linked academic self-concept with particular subject areas (e.g., English, history, math and science), and they further divided non-academic self-concept into three categories, namely social, emotional and physical self-concept. Among these categories, academic self-concept is the most common one in educational environments. Academic self-concept can be defined as the individuals' perceptions, feelings and perspectives about their academic skills

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and it reflects their beliefs about a certain intellectual or academic environment (Lent et al. 1997). One of the most common definitions of academic self-concept is the individual's way of showing his/her skills mentally in school or in academic environments (Brunner et al. 2010).

Many researchers have supported that academic self-concept plays a central role in the academic achievement and adaptation of the students; therefore, researching how students develop their academic self-concept and its effect on achievement are becoming more important (Wouters et al. 2015). A major problem, however, is the direction of the relationship between these two concepts. In other words, does academic self-concept affect academic achievement or the vice versa? The review of the literature on self-concept revealed three major models about the relationship between academic self-concept and academic achievement. The first model is the self-enhancement model which assumes that academic self-concept affects academic achievement. According to this model, academic achievement can be increased by eliminating negative feelings and situations about individuals' own selves (Marsh and Scalas 2011). The second model is the skill development model which assumes that academic achievement affects academic self-concept. According to this model, the academic self-concept of students can be improved by improving their academic skills. Marsh (1990) criticized these two models and suggested the reciprocal effects model which emphasizes that there is a reciprocal relationship between self-concept and academic achievement. According to this model, the relationship between academic self-concept and academic achievement is reciprocal and mutually reinforcing.

The presence of a reciprocal relationship between academic self-concept and academic achievement has been a source of inspiration for scientific debates, numerous theoretical models and many experimental works (Retelsdorf et al. 2014). The review of these studies shows that there is a strong relationship between academic self-concept and academic achievement (Areepattamannil 2012a; Fryer 2015; Hansford and Hattie 1982; Huang 2011; Iroegbu 2013; Marsh and Hau 2004; Marsh and Martin 2011; Möller and Pohlmann 2010; Skaalvik and Skaalvik 2004; van den Berg and Coetzee 2014; Wang and Lin 2008; Yoshino 2012). This reciprocal relationship between self-concept and achievement shows that self-concept and achievement are the predictors and outcomes of the learning process (Fryer 2015). In addition to the works that directly examine the relationship between these two concepts, the studies that focus on the moderator role of these variables are also interesting. In this context, Areepattamannil (2012b) examined the moderator role of academic motivation in the relationship between school self-concept and school achievement; he found that for Indian immigrant adults in Canada both intrinsic and extrinsic motivations play a moderator role in the relationship between school self-concept and school achievement; however, for Indian adults in India intrinsic motivation is the only moderator variable in this relationship. Similarly, Khalaila (2015) and Areepattamannil (2012a) emphasized that academic self-concept was one of the most important variables that motivated students, and they underlined that it was an important factor for improving achievement. In this context, supporting students' achievement and improving their academic self-concept are perceived as interwoven components of formal education, and self-concept is considered as an important factor for predicting future achievement (Fryer 2015). In other words, examining the reciprocal relationship between these two concepts and making relevant deductions are important for improving students' academic self-concept and increasing their academic achievement.

This study investigated the effect of self-concept on student achievement. Additionally, the factors that are thought to affect the average effect size obtained in the study were set as moderators. These are *(i)* the publication year of the research, *(ii)* the publication type of the research, *(iii)* the country (culture) where the research was carried out, *(iv)* the course in which the achievement was measured, and *(v)* school level. All these variables, along with the results of previous studies, were used to test the following hypotheses of this study:

$\mathbf{H_1}$ Self-concept has a positive effect on student achievement.
$\mathbf{H_2}$ School subject or assessment type is a moderator for the positive effect of self-concept on student achievement.
$\mathbf{H_3}$ Country (culture) in which the study was conducted is a moderator for the positive effect of self-concept on student achievement.
$\mathbf{H_4}$ Publication year of research is a moderator for the positive effect of self-concept on student achievement.
$\mathbf{H_5}$ Publication type of research is a moderator for the positive effect of self-concept on student achievement.
$\mathbf{H_6}$ School level is a moderator for the positive effect of self-concept on student achievement.

7.2 Method

7.2.1 Study Design

In this study, the effect of self-concept on student achievement was tested with a meta-analysis design.

7.2.2 Review Strategy and Criteria for Inclusion/Exclusion

To determine the research studies to include in the meta-analysis, the Science-Direct, Proquest and Ebsco academic databases were used to conduct a literature review. For this process, the terms *self-concept* and *student achievement/student success* included in the titles of the studies were used to screen the research studies. The deadline for the research studies included in the research was identified as January 2016. Doctoral dissertations and peer-reviewed journals were included in the study.

Many strategies were used to identify the research studies that were appropriate for the meta-analysis of the study. First, a research study pool (962 research studies) was established; it included all studies with self-concept and student achievement/success in their titles. The studies which were obtained, limited to years 2005–2015. The abstracts of these studies were reviewed, and 191 research studies were found to be appropriate to include in the study. In the second stage, abstracts of research studies were examined in detail. The results of the examination found that 123 of the research studies in the pool were appropriate, and 65 were not found to be appropriate. The descriptive statistics of the 123 research studies included in the analysis are presented in Table 7.1.

The criteria for inclusion of the research studies in the analysis study were identified as follows:

- To have the statistical information necessary for correlational meta-analysis (n and r, or R^2 values)
- To be a study measuring the correlation self-concept and student achievement/success

Reasons for not including a research study in the meta-analysis:

- Having no quantitative data (qualitative research)
- Not having a correlation coefficient
- Not focusing on student achievement
- Not focusing on self-concept.

7.2.3 Coding Process

The coding process was essentially a data sorting process used to ascertain which data were clear and suitable for the study. In this scope, a coding form was developed before the statistical analysis was conducted, and the coding was conducted according to the form. The main aim was to develop a specific coding system that allowed the study to see the entirety of the research studies in general and that would not miss any characteristics of each individual research study. The coding form developed in the study was comprised of:

Table 7.1 Characteristics of the studies included in the meta-analysis

Options		1	2	Total
Publication year		2005–2009	2010 and beyond	–
	n	57	66	123
	%	46.4	53.6	100
Publication type		Dissertations	Articles	
	n	36	87	123
	%	29.3	70.7	100

- References for the research
- Sample information
- Publication types and years of studies
- School subject or assessment type
- Methodological information
- Quantitative values.

7.2.4 Statistical Processes

The effect size acquired in meta-analysis is a standard measure value used in the determination of the strength and direction of the relationship in the study (Borenstein et al. 2009). Pearson's correlation coefficient (r) was determined to be the effect size in this study. Because the correlation coefficient has a value between *+1* and *−1,* the *r* value calculated was evaluated by converting this value into the value as it appears in the *z* table (Hedges and Olkin 1985). Provided that more than one correlation value is given between the same structure categories in correlational meta-analysis studies, two different approaches are used in the determination of the one to be used in the meta-analysis (Borenstein et al. 2009; Kulinskaya et al. 2008). For this study, (*i*) first, if the correlations were independent, all the related correlations were included in the analysis and were considered to be independent studies, and (*ii*) if there were dependent correlations, then the *highest correlation value* were accepted. A *random effect model* was used for the meta-analysis processes in this study. The *Comprehensive Meta-Analysis* program was used in the meta-analysis process.

7.2.5 Moderator Variables

To determine the statistical significance of the differences between the moderators of the study, only the Q_b values were used. Four moderator variables that were expected to have a role in the average effect size were identified in the study. The first of these considered is *the publication year of research* as a moderator in regards to the relationship between self-concept and student achievement. The second is the *publication type*. The rest are the *country (culture)* in which the study conducted *school subject/assessment type* and *school grade*.

7.2.6 Publication Bias

A funnel plot for the research studies included in the meta-analysis of can be seen in Fig. 7.1. Evidence that publication bias affected the research studies included in the meta-analysis can be seen in Fig. 7.1. A serious asymmetry would be expected in

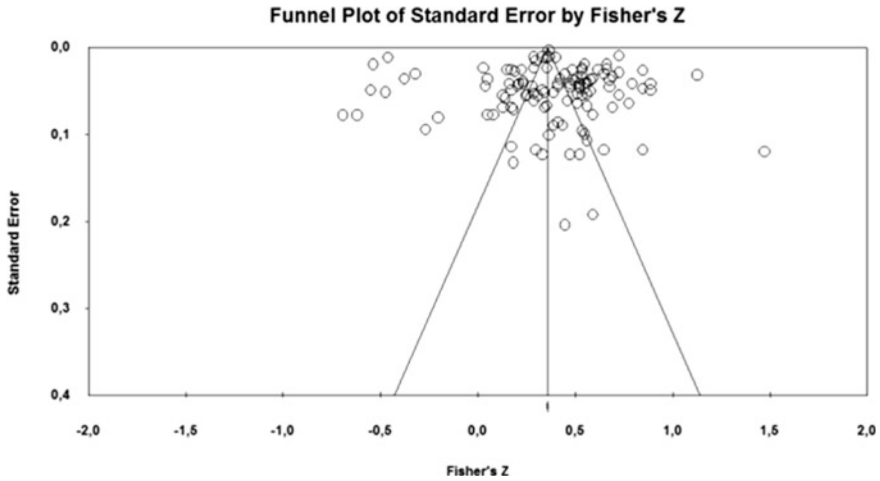

Fig. 7.1 Effect size funnel for publication bias

Table 7.2 Duval and Tweedie's trim and fill test results

	Excluded studies	Point estimate	CI (confidence interval)		Q
			Lower limit	Upper limit	
Observed values		0,34	0,33	0,34	6268.02*
Corrected values	0	0,34	0,33	0,34	6268.02*

*$p < .05$

the funnel plot if there were a publication bias. The concentration of plots on one side under the line of average effect size, particularly in the bottom section of the funnel, suggests the probability of a publication bias in the research studies. In this study, no evidence of partiality of the publications was observed in any of the 123 data subjected to meta-analysis

Although no partiality in publications was observed in the funnel plot, the results of Duval and Tweedie's trim and fill test, which was applied to determine the effect of partiality in publications acquired with the meta-analysis using the random effect model, are given in Table 7.2. As is seen in Table 7.2, there is no difference between the effect observed and the artificial effect size created to fix the effect of the partiality of publications. The research on each side of the center line is symmetrical, and this is the indicator of non-difference. Because there is no evidence indicating lost data on either side of the center line, the difference between the fixed effect size and observed effect size is zero.

7.3 Findings

The results of the meta-analysis about the relationship between self-concept and student achievement are displayed in Table 7.3. The findings supported hypothesis H1 which formulated that there is a positive relationship between self-concept and student achievement. The effect size of self-concept on student achievement was calculated as .38, which showed that self-concept had a medium level effect (see Cohen 1988) on student achievement.

The first moderator analysis did not support hypothesis H2 which stated that the course in which the achievement was measured has an effect on student achievement. Although the effect size differences were not found to be statistically significant, ($Q_b = 4.34$, $p > .05$) the effect of self-concept was low on language using ability [$r = .30$] and medium on cumulative point average [$r = .36$], mathematics [$r = .41$], English [$r = .41$], reading ability [$r = .41$] and chemistry [$r = .43$]. According to this moderator analysis, among the various courses the highest effect size of self-concept on student achievement belonged to music [$r = .51$].

The findings did not support hypothesis H3 which formulated that the culture where the research was carried out plays a moderator role in the effect of self-concept on student achievement. Although the effect size differences were not found to be statistically significant ($Q_b = 3.49$, p > .05) self-concept had a medium level significant effect on achievement in both horizontal-individualistic cultures [$r = -.36$] and vertical-collectivist cultures [$r = .43$].

The findings did not support hypothesis H4 which stated that the publication year of the studies plays a moderator role in the effect of self-concept on achievement. Although the effect size differences among the publication years of the studies were not found to be statistically significant ($Q_b = .09$, p > .05) for the studies conducted between 2005 and 2009 [$r = .39$] and from 2010 onwards [$r = .38$] the effect of self-concept on student achievement was medium and statistically significant.

The findings supported hypothesis H5 which formulated that the publication type plays a moderator role in the effect size of self-concept on student achievement. While the effect size difference between the publication types was found to be statistically significant ($Q_b = 18.08$, p < .05) the effect of self-concept on student achievement was at a low level for articles [$r = .27$] and at a medium level for dissertations [$r = .42$].

The findings supported hypothesis H6 which formulated that the school level plays a moderator role in the effect of self-concept on achievement. The effect size differences among school levels were statistically significant ($Q_b = 12.5$ $p < .05$). In particular, while the effect of self-concept on student achievement was at a low level and significant for elementary schools [$r = .30$] the effect was at a medium level and significant for high schools [$r = .36$], secondary schools [$r = .39$], universities [$r = .43$] and for mixed groups [$r = .32$] which included more than one education level.

Table 7.3 Findings of the correlations between self-concept and student achievement: Results of the meta-analysis

Variables	k	N	*r*	CI (confidence interval)		Q	Q_b
				Lower limit	Upper limit		
Self-concept	123	223.068	.38*	.35	.41	**6268.02***	
Moderator [course]							**4.34**
GPA	50	38.754	.36*	.31	.42		
Mathematic	32	128.009	.41*	.35	.48		
English	15	16.230	.41*	.31	.50		
Reading ability	6	4435	.41*	.25	.55		
German	5	3848	.32*	.14	.48		
Science	3	3077	.33*	.09	.53		
Physical education	2	2262	.26	−.03	.52		
Chinese	2	1862	.39*	.10	.61		
Language using ability	2	889	.30*	.00	.55		
French	2	873	.34*	.05	.58		
Biology	1	7413	.34	−.07	.65		
Physics	1	7413	.38	−.02	.67		
Chemistry	1	7413	.43*	.03	.71		
Music	1	590	.51*	.12	.76		
Moderator [country]							**3.49**
Vertical-collectivist	33	31.087	.43*	.37	.48		
Horizontal individualistic	90	191.981	.36*	.33	.40		
Moderator [publication year]							**0.09**
2005–2009	57	34.031	.39*	.34	.43		
2010 and beyond	66	189.037	.38*	.34	.42		
Moderator [publication type]							**18.08***
Dissertation	87	212.850	.42*	.39	.45		
Article	36	10.218	.27*	.21	.33		
Moderator [school level]							**12.5***
Secondary	43	65.310	.39*	.34	.44		
High	29	132.814	.36*	.30	.43		
Elementary	25	10.092	.30*	.23	.37		
University	18	6487	.43*	.35	.50		
Mixed	8	8365	.52*	.41	.61		

*$p < .05$

7.4 Conclusion

This meta-analysis which aimed to determine the effect size of self-concept on student achievement included 123 studies. In this study, publication year, publication type, the country (culture) where the research was carried out, the course in which the achievement was measured and the level of education were taken as moderator variables. The meta-analysis results obtained from the study showed that self-concept had a medium level positive effect on student achievement. This finding supports the view in the literature that self-concept is associated with student achievement (Areepattamannil 2012a; Fryer 2015; Hansford and Hattie 1982; Huang 2011; Iroegbu 2013; Marsh and Hau 2004; Marsh and Martin 2011; Möller and Pohlmann 2010; Skaalvik and Skaalvik 2004; van den Berg and Coetzee 2014; Wang and Lin 2008; Yoshino 2012). It is possible, therefore, to conclude that self-concept is an important factor for increasing student achievement as well as for predicting it (Fryer 2015).

The findings of moderator analysis showed that the effect size differences among the courses in which the achievement was measured were not statistically significant. On the other hand, it was observed that self-concept had a significant low level effect on language using ability [$r = .30$] and a medium effect on cumulative point average [$r = .36$], mathematics [$r = .41$], English [$r = .41$], reading ability [$r = .41$], and chemistry [$r = .43$]. According to this moderator analysis, the highest effect size of self-concept on student achievement among the various courses belonged to music [$r = .51$]. The above results regarding self-concept and academic achievement of students confirm the findings from the current literature. In particular, it is argued in the literature that self-concept is positively associated with language using ability (Fryer 2015), chemistry (Jansen et al. 2014), cumulative point average (Areepattamannil and Freeman 2008; Areepattamannil 2012b; Bell 2005; Marsh et al. 2006), mathematics (Abu-Hilal and Nasser 2012; Areepattamannil 2012a; Yoshino 2012), English (Noureen and Naz 2011b; Pinxteen et al. 2010), reading ability (Förster and Souvignier 2014; Guich 2007) and music (Ruismaki and Tereska 2006).

The effect size difference of the country (culture) was not statistically significant. The effect of self-concept on student achievement was at a medium level and statistically significant in both horizontal individualistic [$r = -.36$] cultures and vertical-collectivist cultures [$r = -.43$]. In other words, the relationship between self-concept and student achievement is reciprocal and mutually reinforcing both in extremely individualistic cultures, such as Canada (Areepattamannil 2012a; Guay et al. 2010; Roy et al. 2015) and Germany (Bakadorova and Raufelder 2014; Förster and Souvignier 2014; Marsh et al. 2006) and in extremely collectivistic cultures, such as China (Chen et al. 2013; Zhou et al. 2015) and Hong Kong (Fong and Yuen 2009; Mclnerney et al. 2012). Therefore, an educator should realize that the relationship between self-concept and student achievement will not function similarly for students coming from different cultural backgrounds and ethnic origins and he should act accordingly (Mclnerney et al. 2012).

As a result of the moderator analysis performed according to publication year, the effect size differences between self-concept and student achievement were not statistically significant. However, in the studies conducted between 2005 and 2009 [r = .39] and from 2010 onwards [r = .38] the effect of self-concept on student achievement is medium and statistically significant. Considering that the values of the effect sizes are close to each other, it is possible to conclude that the relationship between self-concept and student achievement is at the focus of the studies for a long time. The analysis of the effect sizes according to publication type showed that the effect of self-concept on student achievement varied for articles and dissertations. While there was a low level effect for articles [r = .27] the effect was significant and at a medium level for dissertations [r = .42].

Concerning the school level on which the studies focused, findings showed that the effect size differences among education levels were statistically significant. In particular, the effect of self-concept on student achievement is low for elementary schools [r = .30] and medium for high schools [r = .36], secondary schools [r = .39], universities [r = .43] and for mixed level schools [r = .52]. These findings overlap with the study of Skaalvik and Skaalvik (2009) which analyzed the moderator effect of self-concept and self-efficacy on academic achievement. The researchers of this study tested the hypothesis that students' self-concept is an important prerequisite of learning and achievement, and they concluded that self-concept has s strong effect on academic achievement a successive education levels.

The results about the effect of self-concept on student achievement are summarized as below:

- Self-concept has a medium level positive effect size [r = .38] on student achievement.
- Regarding the moderator variables, the country (culture) where the research was carried out, the course in which the achievement was measured and publication year do not play a moderator role in the effect size of self-concept on student achievement, whereas publication type and school level play a moderator role in the effect size of self-concept on student achievement.

Based on the results obtained from this study, it is concluded that there is a strong relationship between self-concept and academic achievement, and these two concepts mutually reinforce each other in educational environments. The finding that students who feel themselves more confident in a certain topic or in a certain course will get better results than other students makes academic self-concept one of the most effective predictors of academic achievement and other desired educational outcomes (OECD 2003). In this context, families, teachers and advisors should focus on improving students' self-concept and academic achievement, and at the same time programs developed for improving self-concept and academic skills should be integrated into the education (Huang 2011). As Marsh and Craven (2006) have argued, considering these two concepts separately would lead to only short-term achievements and reduce the effectiveness of education programs.

Accordingly, this meta-analysis study is important in terms of revealing that the studies focusing on the relationship between self-concept and student achievement should be deeply examined. Therefore, in order to examine the effect of self-concept on academic achievement, it is suggested that further qualitative studies and comparative meta-analysis studies should be conducted.

References

Note. "*" References marked with an asterisk indicate studies included in the meta–analysis. The in–text citations to studies selected for meta–analysis are not followed by asterisks.

Abu-Hilal, M., & Nassera, I. (2012). Direct and ıüindirect effects of iq, parental help, effort, and mathematics self-concept on mathematics achievement. *Europe's Journal of Psychology*, *8*(4), 573.*

Appleby, M. (2012). *The effect of treatment length on academic achievement, classroom behavior, and self-concept among emotionally disturbed children* (Order No. 3513179). Available from ProQuest Dissertations & Theses Global. (1027595134). Retrieved from http://search.proquest.com/docview/1027595134?accountid=16716*

Areepattamannil, S. (2006). *Academic achievement, academic self-concept, and academic motivation of immigrant adolescents in greater Toronto area (GTA) secondary schools* (Order No. MR18688). Available from ProQuest Dissertations & Theses Global. (304971201). Retrieved from http://search.proquest.com/docview/304971201?accountid=16716*

Areepattamannil, S. (2011). *Academic self-concept, academic motivation, academic engagement, and academic achievement: A mixed methods study of Indian adolescents in Canada and India* (Order No. NR78361). Available from ProQuest Dissertations & Theses Global. (1002731557). Retrieved from http://search.proquest.com/docview/1002731557?accountid=16716*

Areepattamannil, S. (2012a). First-and second-generation immigrant adolescents' multidimensional mathematics and science self-concepts and their achievement in mathematics and science. *International Journal of Science and Mathematics Education*, *10*(3), 695–716.*

Areepattamannil, S. (2012b). Mediational role of academic motivation in the association between school self-concept and school achievement among Indian adolescents in Canada and India. *Social Psychology of Education*, *15*(3), 367–386.*

Areepattamannil, S., & Freeman, J. G. (2008). Academic achievement, academic self-concept, and academic motivation of immigrant adolescents in the greater Toronto area secondary schools. *Journal of Advanced Academics*, *19*(4), 700–743.*

Arens, A. K., Bodkin-Andrews, G., Craven, R. G., & Yeung, A. S. (2014). Self-concept of Indigenous and non-Indigenous Australian students: Competence and affect components and relations to achievement. *Learning and Individual Differences*, *32*, 93–103.*

Bacon, L. S. C. (2011). *Academic self-concept and academic achievement of African American students transitioning from urban to rural schools* (Order No. 3473142). Available from ProQuest Dissertations & Theses Global (894472427). Retrieved from http://search.proquest.com/docview/894472427?accountid=16716*

Bakadorova, O., & Raufelder, D. (2014). The mediating role of socio-motivational support in the association between individual school self-concept and achievement motivation amongst adolescent students. *European Journal of Psychology of Education, 29*(3), 347–366.*

Bell, Y. (2005). *The impact of an educational program on self-concept and academic achievement of pre-adolescent African American males* (Order No. 3185605). Available from ProQuest Dissertations & Theses Global (305383429). Retrieved from http://search.proquest.com/docview/305383429?accountid=16716*

Bell, Y. R. (1975). *The effect of perceptual support on the performance of preoperational, transitional and operational children on multiple classification tasks* (Order No. 7604508). Available from ProQuest Dissertations & Theses Global (302796015). Retrieved from http://search.proquest.com/docview/302796015?accountid=16716

Bong, M., & Skaalvik, E. M. (2003). Academic self-concept and self-efficacy: How different are they really? *Educational Psychology Review, 15,* 1–40.

Borenstein, M., Hedges, L. V., Higgins, J. P. T., & Rothstein, H. R. (2009). *Introduction to meta-analysis*. UK: Wiley.

Brunner, M., Keller, U., Dierendonck, C., Reichert, M., Ugen, S., Fischbach, A., et al. (2010). The structure of academic self-concepts revisited: The nested Marsh Shaveson model. *Journal of Educational Psychology, 102,* 964–981.

Chanal, J. P., Sarrazin, P. G., Guay, F., & Boiché, J. (2009). Verbal, mathematics, and physical education self-concepts and achievements: An extension and test of the internal/external frame of reference model. *Psychology of Sport and Exercise*, *10*(1), 61–66.*

Chen, S. K., Hwang, F. M., Yeh, Y. C., & Lin, S. S. (2012). Cognitive ability, academic achievement and academic self-concept: Extending the internal/external frame of reference model. *British Journal of Educational Psychology*, *82*(2), 308–326.*

Chen, S. K., Yeh, Y. C., Hwang, F. M., & Lin, S. S. (2013). The relationship between academic self-concept and achievement: A multicohort–multioccasion study. *Learning and Individual Differences*, *23*, 172–178.*

Chiu, M. M., & Klassen, R. M. (2010). Relations of mathematics self-concept and its calibration with mathematics achievement: Cultural differences among fifteen-year-olds in 34 countries. *Learning and Instruction*, *20*(1), 2–17.*

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Hillside, NJ: Lawrence Erlbaum Associates. Columbia University.

Cokley, K. O., & Chapman, C. (2008). The roles of ethnic identity, anti-white attitudes, and academic self-concept in African American student achievement. *Social Psychology of Education*, *11*(4), 349–365.*

Cvencek, D., Kapur, M., & Meltzoff, A. N. (2015). Math achievement, stereotypes, and math self-concepts among elementary-school students in Singapore. *Learning and Instruction*, *39*, 1–10.*

Damrongpanit, S. (2009). The study of growth between academic self-concept, nonacademic self-concept, and academic achievement of ninth-grade students: A multiple group analysis. *Research in Higher Education Journal*, *5*, 1.*

De Fraine, B., Van Damme, J., & Onghena, P. (2007). A longitudinal analysis of gender differences in academic self-concept and language achievement: A multivariate multilevel latent growth approach. *Contemporary Educational Psychology*, *32*(1), 132–150.*

Denissen, J. J., Zarrett, N. R., & Eccles, J. S. (2007). I like to do it, I'm able, and I know I am: Longitudinal couplings between domain-specific achievement, self-concept, and interest. *Child Development*, *78*(2), 430–447.*

Erten, İ. H., & Burden, R. L. (2014). The relationship between academic self-concept, attributions, and L2 achievement. *System*, *42*, 391–401.*

Fong, R. W., & Yuen, M. (2009). Associations among measures of perfectionism, self-concept and academic achievement identified in primary school students in Hong Kong. *Gifted and Talented International*, *24*(1), 147–155.*

Förster, N., & Souvignier, E. (2014). Learning progress assessment and goal setting: Effects on reading achievement, reading motivation and reading self-concept. *Learning and Instruction*, *32*, 91–100.*

Fritzsche, E. S., Kröner, S., Dresel, M., Kopp, B., & Martschinke, S. (2012). Confidence scores as measures of metacognitive monitoring in primary students? (Limited) validity in predicting academic achievement and the mediating role of self-concept. *Journal for Educational Research Online*, *4*(2), 120.*

Fryer, L. K. (2015). Predicting self-concept, interest and achievement for first-year students: The seeds of lifelong learning. *Learning and Individual Differences*, *38*, 107–114.*

Guay, F., Ratelle, C. F., Roy, A., & Litalien, D. (2010). Academic self-concept, autonomous academic motivation, and academic achievement: Mediating and additive effects. *Learning and Individual Differences*, *20*(6),644–653.*

Guich, S. A. (2007). *Relationships among reading self-concept, beliefs about concepts of ability, and reading achievement in emergent readers* (Order No. 3275433). Available from ProQuest Dissertations & Theses Global. (304901955). Retrieved from http://search.proquest.com/docview/304901955?accountid=16716*

Hansford, B. C., & Hattie, J. A. (1982). The relationship between self and achievement/performance measures. *Review of Educational Research, 52*(1), 123–142.

Haynes, B. P. (2005). *Academic self-concept, racial/ethnic identity, school satisfaction and achievement in African American boys: A comparative developmental study* (Order No. 3237692). Available from ProQuest Dissertations & Theses Global (305367638). Retrieved from http://search.proquest.com/docview/305367638?accountid=16716*

Hedges, L. V., & Olkin, I. (1985). *Statistical method for meta-analysis*. United Kingdom: Academic Press.

Hernandez, A. A. (2009). *The relationship among the nurturance and monitoring dimensions of parenting, academic self-concept, and acculturation in the academic achievement of Latino college students* (Order No. 3368547). Available from ProQuest Dissertations & Theses Global (304996543). Retrieved from http://search.proquest.com/docview/304996543?accountid=16716*

Howard, J. V. (2006). *The impact of academic self-concept, achievement, and discipline on middle school student success* (Order No. 3361393). Available from ProQuest Dissertations & Theses Global (304920623). Retrieved from http://search.proquest.com/docview/304920623?accountid=16716*

Huang, C. (2011). Self-concept and academic achievement: A meta-analysis of longitudinal relations. *Journal of School Psychology*, *49*, 505–528. Retrieved from http://dx.doi.org/10.1016/j.jsp.2011.07.001

Iroegbu, M. N. (2013). Effect of test anxiety, gender and perceived self-concept on academic performance of Nigerian students. *International Journal of Psychology Counselling, 5*(7), 143–146.

Jansen, M., Schroeders, U., & Lüdtke, O. (2014). Academic self-concept in science: Multidimensionality, relations to achievement measures, and gender differences. *Learning and Individual Differences*, *30*, 11–21.*

Joshi, S., & Srivastava, R. (2014). An exploration of rural and urban adolescents' academic self-concept and academic achievement in different type of schools. *Social Science International, 30*(1), 77.

Khalaila, R. (2015). The relationship between academic self-concept, intrinsic motivation, test anxiety, and academic achievement among nursing students: Mediating and moderating effects. *Nurse Education Today*, *35*(3), 432–438.*

Kornilova, T. V. (2009). Academic achievement in college: The predictive value of subjective evaluations of intelligence and academic self-concept. *Psychology in Russia: State of the art*, *2*(1).*

Kornilova, T. V., Kornilov, S. A., & Chumakova, M. A. (2009). Subjective evaluations of intelligence and academic self-concept predict academic achievement: Evidence from a selective student population. *Learning and Individual Differences*, *19*(4), 596–608.*

Kraja, P. (2014). The influence of academic achievement in pupils' academic self-concept construction during the transition to lower secondary education. *Participatory Educational Research (PER)*.*

Kulinskaya, E., Morgenthaler, S., & Staudte, R. G. (2008). *Meta analysis: A guide to calibrating and combining statistical evidence*. London: John Wiley & Sons.

Leibham, M. B., Alexander, J. M., & Johnson, K. E. (2013). Science Interests in Preschool Boys and Girls: Relations to Later Self-Concept and Science Achievement. *Science Education*, *97*(4), 574–593.*

Leibham, M. E. (2005). *The impact of interest on elementary school children's self-concepts, intrinsic motivation, academic achievement, and willingness to broaden knowledge* (Order No. 3182617). Available from ProQuest Dissertations & Theses Global (304987159). Retrieved from http://search.proquest.com/docview/304987159?accountid=16716*

Lent, R. W., Brown, S. D., & Gore, P. A. (1997). Discriminant and predictive validity of academic self-concept, academic self-efficacy, and mathematics-specific self-efficacy. *Journal of Counseling Psychology, 44,* 307–315.

Lloyd, H. J. (2014). *The impact of racial identity, masculinity, and academic self-concept on the academic achievement of African American male high school students* (Order No. 3582857). Available from ProQuest Dissertations & Theses Global (1629435907). Retrieved from http://search.proquest.com/docview/1629435907?accountid=16716*

Luo, W., Hogan, D., Tan, L. S., Kaur, B., Ng, P. T., & Chan, M. (2014). Self-construal and students' math self-concept, anxiety and achievement: An examination of achievement goals as mediators. *Asian Journal of Social Psychology*, *17*(3), 184–195.*

Marsh, H. W., & Martin, A. J. (2011). Academic self-concept and academic achievement: Relations and causal ordering. *British Journal of Educational Psychology, 81,* 59–77.

Marsh, H. W. (1990). The causal ordering of academic self-concept and academic achievement: A multiwave, longitudinal panel analysis. *Journal of Educational Psychology, 82,* 646–656.

Marsh, H. W., & Craven, R. G. (2006). Reciprocal effects of self-concept and performance from a multidimensional perspective: Beyond seductive pleasure and unidimensional perspectives. *Perspectives on Psychological Science, 1*(2), 133–163.

Marsh, H. W., & Hau, K. T. (2004). Explaining paradoxical relations between academic self-concepts and achievements: Cross-cultural generalizability of the internal/external frame of reference predictions across 26 countries. *Journal of Educational Psychology, 96*(1), 56.

Marsh, H. W., & Scalas, L. F. (2011). Self-concept in learning: Reciprocal effects model between academic self-concept and academic achievement. *Social and Emotional Aspects of Learning*, 191–198.

Marsh, H. W., Trautwein, U., Lüdtke, O., Köller, O., & Baumert, J. (2006). Integration of multidimensional self-concept and core personality constructs: Construct validation and relations to well-being and achievement. *Journal of personality*, *74*(2), 403–456.*

Martin, S. (2007). Does self-concept and motivation in high school predict future success via readiness in first year undergraduate students (Unpublished doctoral dissertation). Mount Saint Vincent University.*

Mayer, C. V. (2014). *Depression and somatization as moderators of the relationship between academic self-concept and academic success* (Order No. 3578896). Available from ProQuest Dissertations & Theses Global (1503779907). Retrieved from http://search.proquest.com/docview/1503779907?accountid=16716*

McInerney, D. M., Cheng, R. W. Y., Mok, M. M. C., & Lam, A. K. H. (2012). Academic self-concept and learning strategies direction of effect on student academic achievement. *Journal of Advanced Academics*, *23*(3), 249–269.*

Möller, J., & Pohlmann, B. (2010). Achievement differences and self-concept differences: Stronger associations for above or below average students? *British Journal of Educational Psychology*, *80*(3), 435–450.*

Möller, J., Streblow, L., & Pohlmann, B. (2009). Achievement and self-concept of students with learning disabilities. *Social Psychology of Education*, *12*(1), 113–122.*

Noureen, G., & Naz, A. (2011). A study of relationship between achievement motivation, self concept and achievement in English and Mathematics at secondary level. *International Education Studies*, *4*(3), 72.*

O'Neill, T. L. (2015). Academic motivation and student self-concept, the keys to positively impacting student success. *Marketing Management Association*, 82–91.*

OECD. (2003). *Student engagement at school: A sense of belonging and participation*. Paris: OECD.

Oliver, L. L. (2013). *Linking self-concept, social comparison and academic achievement in preadolescents* (Order No. 3556876). Available from ProQuest Dissertations & Theses Global

(1328405182). Retrieved from http://search.proquest.com/docview/1328405182?accountid=16716*

Piciullo, T. J. (2009). *School membership, parent academic expectations, peer relationships, student-teacher relationships, academic self-concept, and academic achievement among ninth grade students from low, average, and high need schools* (Order No. 3368241). Available from ProQuest Dissertations & Theses Global (305169202). Retrieved from http://search.proquest.com/docview/305169202?accountid=16716*

Pinxten, M., Fraine, B., Damme, J., & D'Haenens, E. (2010). Causal ordering of academic self-concept and achievement: Effects of type of achievement measure. *British Journal of Educational Psychology, 80*(4), 689–709.

Prince, D., & Nurius, P. S. (2014). The role of positive academic self-concept in promoting school success. *Children and Youth Services Review*, *43*, 145–152.*

Pruett, K. E. (2010). *Differences in academic achievement and academic self-concept based on intellectual ability, grade retention, and special education status* (Order No. 1474859). Available from ProQuest Dissertations & Theses Global (193353104). Retrieved from http://search.proquest.com/docview/193353104?accountid=16716*

Raju, P. M., & Asfaw, A. (2009). Recalled test anxiety in relation to achievement, in the context of general academic self-concept, study habits, parental involvement and socio-economic status among Grade 6 Ethiopian students. *Education 3–13*, *37*(3), 269–285.*

Retelsdorf, J., Köller, O., & Möller, J. (2014). Reading achievement and reading self concept–Testing the reciprocal effects model. *Learning and Instruction*, *29*, 21–30.*

Rinn, A. N., McQueen, K. S., Clark, G. L., & Rumsey, J. L. (2008). Gender differences in gifted adolescents' math/verbal self-concepts and math/verbal achievement: Implications for the stem fields. *Journal for the Education of the Gifted*, *32*(1), 34–53.*

Rost, D. H., Sparfeldt, J. R., Dickhäuser, O., & Schilling, S. R. (2005). Dimensional comparisons in subject-specific academic self-concepts and achievements: A quasi-experimental approach. *Learning and Instruction*, *15*(6), 557–570.*

Roy, A., Guay, F., & Valois, P. (2015). The big-fish–little-pond effect on academic self-concept: The moderating role of differentiated instruction and individual achievement. *Learning and Individual Differences*, *42*, 110–116.*

Ruismäki, H., & Tereska, T. (2006). Early childhood musical experiences: Contributing to pre-service elementary teachers' self-concept in music and success in music education (during student age). *European Early Child hood Education Research Journal*, *14*(1), 113–130.*

Saracaloğlu, A. S., & Varol, S. R. (2007). Beden eğitimi öğretmeni adaylarinin yabanci dile yönelik tutumlari ve akademik benlik tasarimlari ile yabanci dil başarilari arasindaki ilişki. *Eğitimde Kuram ve Uygulama*, *3*(1), 39–59.*

Schyns, B., & Schillng, J. (2013). How bad are the effects of bad leaders? A meta analysis of destructive leadership and its outcomes. *The Leadership Quarterly, 24*, 138–158.

Seaton, M., Parker, P., Marsh, H. W., Craven, R. G., & Yeung, A. S. (2014). The reciprocal relations between self-concept, motivation and achievement: juxtaposing academic self-concept and achievement goal orientations for mathematics success. *Educational Psychology*, *34*(1), 49–72.*

Sebald, H. (2010). *Student participation in extracurricular activities, self-concept, academic self-concept, self-determination, and health habits during the middle school year and their impact on academic achievement (Unpublished doctoral dissertation)*. NewYork: Dowling College.

Senler, B., & Sungur, S. (2009). Parental influences on students' self-concept, task value beliefs, and achievement in science. *The Spanish journal of psychology*, *12*(1), 106.*

Shavelson, R. J., Hubner, J. J., & Stanton, G. C. (1976). Self-concept: Validation of construct interpretations. *Review of Educational Research, 46,* 407–441.

Skaalvik, E. M., & Skaalvik, S. (2009). Self-concept and self-efficacy in mathematics: Relation with mathematics motivation and achievement. *Journal of Educational Research*, *3*(3), 255–278.*

Skaalvik, S., & Skaalvik, E. M. (2004). Gender differences in math and verbal self-concept, performance expectations, and motivation. *Sex Roles, 50*(3–4), 241–252.

Soufi, S., Damirchi, E. S., Sedghi, N., & Sabayan, B. (2014). Development of structural model for prediction of academic achievement by global self-esteem, academic self-concept, self-regulated learning strategies and autonomous academic motivation. *Procedia-Social and Behavioral Sciences*, *114*, 26–35.*

Tabone, F. N. (2011). *Academic self-concept, self-efficacy, and achievement among students with and without learning disabilities* (Order No. 3452797). Available from ProQuest Dissertations & Theses Global (866605068). Retrieved from http://search.proquest.com/docview/866605068?accountid=16716*

Taylor, E. (2014). *Race achievement gap: How motivation orientation, school climate, and academic self-concept predict school achievement* (Order No. 3579647). Available from ProQuest Dissertations & Theses Global (1508513500). Retrieved from http://search.proquest.com/docview/1508513500?accountid=16716*

van den Berg, G., & Coetzee, L. R. (2014). Academic self concept and predictors of academic achievement. *International Journal of Educational Sciences, 6*(3), 469–478.

Van Soom, C., & Donche, V. (2014). Profiling first-year students in STEM programs based on autonomous motivation and academic self-concept and relationship with academic achievement. *PloS One*, *9*(11), e112489.*

Wang, J., & Lin, E. (2008). An alternative interpretation of the relationship between self-concept and mathematics achievement: Comparison of Chinese and US students as a context. *Evaluation & Research in Education, 21*(3), 154–174.

Ward, P. A. (2006). *Achievement and self-concept in diverse populations of gifted middle school students* (Order No. 3193573). Available from ProQuest Dissertations & Theses Global (304964844). Retrieved from http://search.proquest.com/docview/304964844?accountid=16716*

Wouters, S., Colpin, H., Van Damme, J., & Verschueren, K. (2015). Endorsing achievement goals exacerbates the big-fish-little-pond effect on academic self-concept. *Educational Psychology, 35*(2), 252–270.*

Yang, R. (2006). *An exploration of self-concept, parent education, parent and student attitudes towards school, study habits and achievement of junior high students* (Order No. MR17532). Available from ProQuest Dissertations & Theses Global (304923235). Retrieved from http://search.proquest.com/docview/304923235?accountid=16716*

Yoshino, A. (2012). The relationship between self-concept and achievement in TIMSS 2007: A comparison between American and Japanese students. *International Review of Education*, *58*(2), 199–219.*

Zhou, Y. X., Ou, C. Q., Zhao, Z. T., Wan, C. S., Guo, C., Li, L., & Chen, P. Y. (2015). The impact of self-concept and college involvement on the first-year success of medical students in China. *Advances in Health Sciences Education*, *20*(1), 163–179.*

Chapter 8
The Effect of Self-regulation on Student Achievement

Şahin Danişman

8.1 Introduction

Technology has been developing dramatically in the last two decades. This rapid change influences societies in that the generated knowledge makes countries or institutions to compete with each other and to try to find efficient ways to select and use the necessary information. Globalization also requires from societies to educate their citizens in regulating their preferences about the amount or the kind of knowledge they need to have, given that a huge amount of knowledge is generated. Emphasizing the ever growing body of information, Nota et al. (2004) state that one of the most important goals of education is helping the students to acquire self-regulation skills, both to support their learning during school years and to prepare them for further studies after compulsory education. Boekaerts (1997) also argues that the major goal of formal education is equipping the students with self-regulatory knowledge and skills.

Metacognition has been defined as the knowledge about cognition and regulation of cognition (Brown 1978; Flavell 1976) or simply as thinking about thinking (Flavell 1979). It has two constituent parts: the knowledge about cognition and the monitoring/control of cognition (Flavell 1979; Schraw et al. 2006). Educational psychologists generally use the term self-regulation to refer to the use of skills included within the regulatory component of metacognition, such as planning, monitoring and evaluating (Baker and Beall 2008). However, there is some confusion about the relationship between metacognition and self-regulation. Having identified the role of cognitive theories in shifting attention from environmental variables towards learners themselves with regard to human functionings, Schunk (2008) drew attention to the vagueness of the notion of cognitive control processes the most influential types of which are metacognition, self-regulation and

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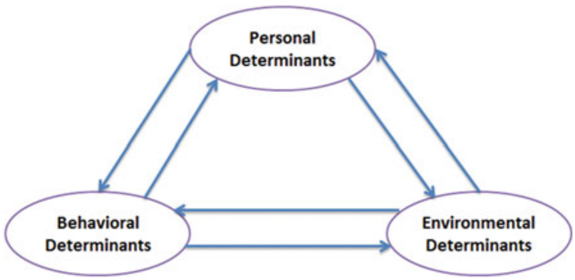
self-regulated learning. Similarly, Dinsmore et al. (2008) in their study examining the meanings of these concepts state that there are no clear definitions of metacognition, self-regulation and self-regulated learning. According to the conclusion of their study, metacognition and self-regulation differ from each other in that the first involves cognitive orientation while the latter is more related to human action. On the other hand, self-regulated learning (SRL) which emerged as a result of studying self-regulation in academic settings focuses on academic learning. At the same time, Kaplan (2008), addressing the same issue, concluded that these three concepts are not distinct but rather they are subtypes of the same general and abstract phenomenon of self-regulated actions. Within this study, self-regulation and SRL have been treated as synonymous as this is also the case in the literature. Since we searched for the relationship between achievement and these constructs, it can be claimed that these terms were used interchangeably in the educational settings.

The SRL development approaches have their roots mainly in social cognitive theory (Zimmerman and Bonner 1996) which favors a model of causation involving triadic reciprocal determinism (Bandura 1986). The reciprocal causation resulting from the model (Fig. 8.1) describes the bidirectional interaction between behavior, cognition and other personal factors and environmental influences (Bandura 1986, 1989). To put it in another way, intellectual development and social functioning are two intertwined processes which cannot be detached from their contexts (Bandura 1989).

Although there is no consensus regarding the definition of SRL among the researchers the focus of their definitions can be considered as similar in some way. Schunk and Zimmerman (1994) defined SRL as "self-generated thoughts, feelings and actions which are systematically oriented towards the attainment of academic goals" (p. 9). In the same way, Zimmerman (1995) conceptualized the self-regulation as a self-directed process which students utilize in order to transform their intellectual capabilities into academic skills. Pintrich and Zusho (2002) also conceptualized self-regulated learning as a self-directed and intrinsically motivated process which is under the deliberate, strategic control of the learner. Pintrich (1995) drew attention to the three different dimensions of learning: observable behavior, motivation and affect and cognition. He also mentioned three characteristics of SRL which interact with these three dimensions. Firstly, the self-regulated learners attempt to control their behavior, motivation/affect and cognition. Secondly, the student has a goal to

Fig. 8.1 Schematization of triadic reciprocal causation in the causal model of social cognitive theory (Bandura 2001, p. 266)



accomplish. Thirdly, the student should control his/her actions individually, as the prefix in the term "self-regulated learning" implies. The self-regulation process is deliberate, judgmental and adaptive in that the students adjust their ways to approach tasks in a cyclical manner (Butler and Winne 1995). Similarly, Winne and Hadwin (1998) claimed that SRL included four phases in a cycle: (i) defining the task where students process information in order to define a task, (ii) setting goals and planning how to reach them where students set goals and select learning strategies, (iii) enacting tactics where students apply their strategies in practice and (iv) adapting metacognition where students adapt their plans and strategies according to self-evaluations. Zimmerman (2002) emphasized that SRL is not a mental capability; rather it is the ability to transform this capability into academic skills. Adapting the works of Berger (2011), Karoly (1993) and Ursache et al. (2012), Dent (2013) attempted to establish a working definition highlighting the process, approach and domain features of self-regulation in her meta-analytic study. She defined self-regulation as "the ability to monitor and modulate one's own cognition, behavior, and emotion in order to achieve a goal or meet the demands of a situation" (p. 4).

There are different conceptualizations about the constituent components of self-regulation. Baker and Brown (1984) stated that among the self-regulatory functions are checking the outcome, planning, monitoring effectiveness, testing, revising and evaluating strategies. After examining the methods used to make high school students participate in class, study and complete their assignments, Zimmerman and Martinez Pons (1986, p. 618) have identified 14 types of self-regulated behavior and a single category of non-self-regulated behavior according to the students' protocols. The list of these self-regulated learning strategies together with their definitions and examples has been presented in Table 8.1.

The proactive qualities and self-motivating abilities of self-regulated learners distinguish them from their peers (Zumbrunn et al. 2011). They are more engaged in learning, voluntarily answer the questions teachers ask, seek help when needed (Pintrich 1995), manipulate their learning environments to meet their learning needs (Kolovelonis et al. 2011), monitor their progress towards their goals, evaluate their performance and make judgments and are motivated intrinsically (Cleary and Zimmerman 2004). Good self-regulator individuals expand their knowledge and cognitive competencies while poor self-regulator ones fall behind (Zimmerman 1990). Moreover, good self-regulated learners organize their goals in a hierarchical way prioritizing the more immediate goals over the long term ones (Zimmerman 2000). Additionally, self-regulated students are expected to actively participate and engage in the learning processes emotionally, motivationally and cognitively (Zimmerman and Schunk 1989).

Self-regulatory strategies have been seen as important for academic performance in the relevant literature (Acun 2014; Pintrich 1995; Pintrich and De Groot 1990; Schunk 1989; Zimmerman 1990). Zimmerman and Martinez-Pons (1986, 1988) found that the students' frequency of using self-regulation strategies predicted a substantial amount of variance in their achievement test scores. The relationship between self-regulation and academic achievement has been examined by a number

Table 8.1 Self-regulated learning strategies: Definitions and examples

(1) Self-evaluation	Statements indicating student-initiated evaluations of the quality or progress of their work, e.g., "I check over my work to make sure I did it right."
(2) Organizing and transforming	Statements indicating student-initiated overt or covert rearrangement of instructional materials to improve learning, e.g., "I make an outline before I write my paper."
(3) Goal-setting and planning	Statements indicating student-initiated setting of educational goals or subgoals and planning for sequencing, timing, and completing activities related to those goals, e.g., "Firstly I start studying two weeks before exams, and I pace myself."
(4) Seeking information	Statements indicating student-initiated efforts to secure further task information from non-social sources when undertaking an assignment, e.g., "Before beginning to write the paper, I go to the library to get as much information as possible concerning the topic."
(5) Keeping records and monitoring	Statements indicating student-initiated efforts to record events or results, e.g., "I took notes from the class discussion.", "I kept a list of the words I got wrong."
(6) Environmental structuring	Statements indicating student-initiated efforts to select or arrange the physical setting to make learning easier, e.g., "I isolate myself from anything that distracts me.", "I turned off the radio so I can concentrate on what I am doing."
(7) Self-consequences	Statements indicating student arrangement or imagination of rewards or punishment for success or failure, e.g., "If I do well on a test, I treat myself to a movie."
(8) Rehearsing and memorizing	Statements indicating student-initiated effort to memorize material by overt or covert practice, e.g., "In preparing for a math test, I keep writing the formula down until I remember it."
(9–11) Seeking social assistance	Statements indicating student-initiated to solicit help from peers (9), teachers (10), and adults (11), e.g., "If I have problems with math assignments, I ask a friend to help."
(12–14) Reviewing records	Statements indicating student-initiated efforts to reread tests (12), notes (13), or textbooks (14), to prepare for class or further testing, e.g., "When preparing for a test, I review my notes."
(15) Other	Statements indicating learning behavior that is initiated by other persons such as teachers or parents, including all unclear verbal responses as well, e.g., "I just do what the teachers says."

of different researchers. Bembenutty et al. (2015) state that research on self-regulation has found out that students reach high levels of personal, academic and professional outcomes when they engage in self-regulatory processes. SRL is found to enhance students' performance/achievement, and these two variable are consistently reported to be related by many researchers (Cleary and Zimmerman

2004; Dent 2013; Kitsantas and Zimmerman 2009; Schunk and Ertmer 2000; Zimmerman 2002, 2011).

The studies (Kitsansas 2002; Sundre and Kitsansas 2004) in the literature conclude that the high-achieving students used more SRL related strategies than the low-achieving students. However, there are some studies finding no relationship between achievement and the use of learning strategies. For example, Pintrich et al. (1991) found that academic achievement was not highly correlated with metacognition and strategy use. The current work addresses this issue bringing together all the studies conducted on the relationship between self-regulation and achievement.

This study aimed to test the following hypotheses which bring together the results of previous studies:

H_1 Self-regulation has a positive effect on student achievement.
H_2 Publication type is a moderator for the positive effect of self-regulation on student achievement.
H_3 Sample group (the level of education) is a moderator for the positive effect of self-regulation on student achievement.
H_4 School subject or assessment type is a moderator for the positive effect of self-regulation on student achievement.
H_5 Country is a moderator for the positive effect of self-regulation on student achievement.
H_6 The year of the studies is a moderator for the positive effect of self-regulation on student achievement.

8.2 Method

8.2.1 Study Design

In this study, the effect of self-regulation on student achievement was tested with a meta-analysis design.

8.2.2 Review Strategy and Criteria for Inclusion/Exclusion

To determine the research studies to include in the meta-analysis, the Science-Direct, Proquest and Ebsco academic databases were used to conduct a literature review. For this process, the terms *self-regulation/ self-regulated/ self-regulatory* and *achievement/success* included in the titles of the studies were used to screen the research studies. The end date for the research studies included in the research was identified as January 2016. Doctoral dissertations and peer-reviewed journals were included in the study.

Many strategies were used to identify the research studies that were appropriate for the meta-analysis of the study. First, a research study pool (1131 research studies) was established; it included all studies with self-regulation/self-regulated/self-regulatory and achievement/success in their titles. The abstracts of these studies were reviewed, and all were found to be appropriate to include in the study. In the second stage, all research studies in the pool were examined in detail. The results of the examination found that 192 of the research studies in the pool were appropriate, and 939 were not found to be suitable. The descriptive statistics of the 192 research studies included in the analysis are presented in Table 8.2.

The criteria for inclusion of the research studies in the analysis study were identified as follows:

- To have the statistical information necessary for correlational meta-analysis (n and r, or R^2 values)
- To be a study measuring the correlation between self-regulation and student achievement/success

Reasons for not including a research study in the meta-analysis:

- Having no quantitative data (qualitative research)
- Not having a correlation coefficient
- Not focusing on student achievement
- Not focusing on self-regulation.

8.2.3 Coding Process

The coding process was essentially a data sorting process used to ascertain which data were clear and suitable for the study. In this scope, a coding form was developed before the statistical analysis was conducted, and the coding was conducted according to the form. The main aim was to develop a specific coding system that allowed the study to see the entirety of the research studies in general and that would not miss any characteristics of each individual research study. The coding form developed in the study was comprised of:

- References for the research,
- Sample information,
- Type of publication,
- Sample group,
- School subject or assessment type,
- Country,
- The years of the studies,
- Data collection tool(s),
- Quantitative values.

Table 8.2 Characteristics of the studies included in the meta-analysis

Variables		1	2	3	4	5	6	7	Total
Type of publication		Thesis/dissertation	Article						–
	n	163	183						346
	%	47	53						100
Sample group/unit		Preschool	Elementary school	Middle school	High school	University	Mixed		
	n	29	37	47	51	156	26		346
	%	8	11	14	15	45	7		100
School subject		Computer	Language	Mathematics	Psychology	Science	Other	Mixed	
	n	6	79	93	7	14	10	137	346
	%	2	23	27	2	4	3	39	100
Country		V-C	H-I						
	n	33	313						346
	%	10	90						100
Publication year		…–2000	2001–2005	2006–2010	2011–2016				
	n	48	43	76	179				346
	%	14	12	22	52				100

8.2.4 Statistical Processes

The effect size acquired in meta-analysis is a standard measure value used in the determination of the strength and direction of the relationship in the study (Borenstein et al. 2009). Pearson's correlation coefficient (r) was determined to be the effect size in this study. Because the correlation coefficient has a value between $+1$ and -1, the r value calculated was evaluated by converting this value into the value as it appears in the z table (Hedges and Olkin 1985). Provided that more than one correlation value is given between the same structure categories in correlational meta-analysis studies, two different approaches are used in the determination of the one to be used in the meta-analysis (Borenstein et al. 2009; Kulinskaya et al. 2008). For this study, (*i*) first, if the correlations were independent, all the related correlations were included in the analysis and were considered to be independent studies, and (*ii*) if there were dependent correlations, then the *highest correlation value* was accepted. A *random effect model* was used for the meta-analysis processes in this study. The *Comprehensive Meta-Analysis* program was used in the meta-analysis process.

8.2.5 Moderator Variables

To determine the statistical significance of the differences between the moderators of the study, only the Q_b values were used. Five moderator variables that were expected to have a role in the average effect size were identified in the study. The first of these considered is the *type of publication* as a moderator in regards to the relationship between self-regulation and student achievement. The second is the *sample group* which was thought to have a role on the average impact of self-regulation on student achievement. The rest are the *school subject/assessment type, country,* and *years of the studies*.

8.2.6 Publication Bias

A funnel plot for the research studies included in the meta-analysis of can be seen in Fig. 8.2. Evidence that publication bias affected the research studies included in the meta-analysis can be seen in Fig. 8.2. A serious asymmetry would be expected in the funnel plot if there were a publication bias. The concentration of plots on one side under the line of average effect size, particularly in the bottom section of the funnel, suggests the probability of a publication bias in the research studies. In this study, no evidence of partiality of the publications was observed in any of the 346 data subjected to meta-analysis.

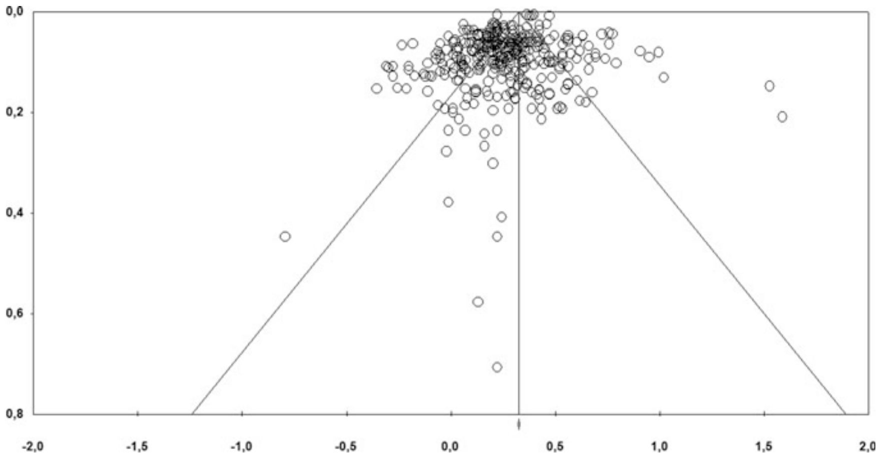


Fig. 8.2 Effect size funnel for publication bias

Table 8.3 Duval and Tweedie's trim and fill test results

	Excluded Studies	Point estimate	CI (confidence interval)		*Q*
			Lower limit	Upper limit	
Observed values		.26	.24	.28	4095.85925
Adjusted values	0	.26	.24	.28	4095.85925

Although no partiality in publications was observed in the funnel plot, the results of Duval and Tweedie's trim and fill test, which was applied to determine the effect of partiality in publications acquired with the meta-analysis using the random effect model, are given in Table 8.3. As shown in Table 8.3, there is no difference between the effect observed and the artificial effect size created to fix the effect of the partiality of publications. The research on each side of the center line is symmetrical, and this is the indicator of non-difference. Because there is no evidence indicating lost data on either side of the center line, the difference between the fixed effect size and observed effect size is zero.

8.3 Findings

Table 8.4 shows the results of the meta-analysis which investigated the relationship between student achievement and self-regulation. The findings supported hypothesis H_1 which argues that there is a positive relationship between student achievement and self-regulation. The effect size of self-regulation on student achievement was calculated to be .26. This value shows that self-regulation has a low level effect (*see* Cohen 1988) on student achievement.

Table 8.4 Findings regarding the relationship between student achievement and self-regulation: Meta-analysis results

Variable	k	N	r	CI (confidence interval)		Q	Q_b
				Lower limit	Upper limit		
Self-regulation	346	215,452	.26*	.24	.28	**4095.859***	
Moderator [Type of publication]							**28.432***
Thesis and dissertation	163	158,078	.21*	.18	.23		
Article	183	57,374	.30*	.28	.32		
Moderator [Sample group]							**63.092***
Preschool	29	9922	.41*	.36	.45		
Elementary school	37	8650	.22*	.17	.27		
Middle school	47	14,638	.31*	.27	.35		
High school	51	12,921	.31*	.27	.35		
University	156	113,443	.21*	.18	.23		
Mixed	26	55,878	.22*	.16	.28		
Moderator [School subject/assessment type]							**9.552**
Computer	6	1120	.25*	.11	.38		
Language	79	62,960	.26*	.22	.29		
Mathematics	93	73,251	.28*	.25	.31		
Psychology	7	2215	.39*	.28	.49		
Science	14	2592	.24*	.15	.33		
Other	10	2938	.26*	.16	.36		
Mixed	137	70,376	.24*	.21	.27		
Moderator [Country]							**5.759****
Vertical-collectivist	33	11,017	.32*	.27	.36		
Horizontal-individualist	313	204,435	.25*	.24	.27		
Moderator [Year of publication]							**15.688***
…–2000	48	9206	.19*	.14	.24		
2001–2005	43	6508	.24*	.19	.29		
2006–2010	76	66,430	.25*	.22	.29		
2011–2016	179	133,308	.29*	.26	.31		

*$p < .01$, **$p < .05$

The results of the moderator analysis confirmed hypothesis H_2 which stated that publication type is a moderator for the positive effect of self-regulation on student achievement. The level of effect of publication type on student achievement was found to be significant ($Q_b = 28.432$, $p < .05$) in the moderator analysis which was conducted through the random effects model. Theses and dissertations have a low level of effect [$r = .21$] while articles have a medium level of effect [$r = .30$] on student achievement.

The findings provided support for hypothesis H_3 which stated that the sample group plays a moderator role on the level of effect that self-regulation has on student achievement. The average weighted correlation between the different sample groups and achievement was significantly different ($Q_b = 63.092$, $p < .05$). In particular, the level of effect of self-regulation on student achievement is statistically significant and medium for preschool [$r = .41$], middle school [$r = .31$] and high school [$r = .31$], while it is significant and low for elementary school [$r = .22$], university [$r = .21$] and mixed group [$r = .22$].

The moderator analysis found no support for hypothesis H_4 asserting that school subject is a moderator variable for the effect of self-regulation on student achievement. There is no statistically significant difference in the level of effect of the various school subjects ($Q_b = 9.552$, $p > .05$). However, the level of effect of self-regulation on student achievement is statistically significant and low for computer [$r = .25$], language [$r = .26$], mathematics [$r = .28$], science [$r = .24$], other subjects [$r = .26$] and general achievement [$r = .24$], whereas it is significant and medium for psychology [$r = .39$].

Findings supported hypothesis H_5 which stated that country played a moderator role in the effect that self-regulation has on student achievement. The moderator analysis showed that the difference between the level of effect of different countries was statistically significant ($Q_b = 5.759$, $p < .05$). It was found that vertical-collectivist [$r = .32$] countries had a significant and medium level effect while horizontal-individualist [$r = .25$] countries had a significant and low level effect on student achievement.

The results of moderator analyses also supported hypothesis H_6 which hypothesized that publication year plays a moderator role in self-regulation having an effect on student achievement. The moderator analysis revealed a statistically significant difference in the level of effect of the publication years of the research studies ($Q_b = 15.688$, $p < .05$). Furthermore, it was found that publication year has a low level effect on student achievement with regard to publications dated before 2000 [$r = .19$], between 2001 and 2005 [$r = .24$], between 2006 and 2010 [$r = .25$], and for studies published in 2011 and 2016 [$r = .29$].

8.4 Conclusion

A total of 192 research studies with 215,452 participants were included in this study aiming to examine the magnitude of the effect size of self-regulation on student achievement. Type of publication, sample group (education level), school subject or assessment type, country, and the years of the studies were considered as moderator variables in the study. The results of the meta-analysis suggested that there is a low level positive effect of self-regulation on student performance. In contrast with this study's results, another meta-analysis study on the same topic by Dent (2013) revealed a strong relationship between self-regulation and achievement. She conducted three meta-analyses within the same study on how the self-regulation construct was labeled, conceptualized, or measured by the author(s). In addition to this, a large part of the literature also points to the fundamental importance of the students' self-regulation skills for the successful navigation through the academic and social settings (McClelland and Cameron 2011; Whitebread and Basilio 2012).

Statistically significant differences between the effect sizes of the different publication types were found by the moderator variable analysis. The articles were found to have higher effect sizes than the theses and dissertations.

Concerning the sample group or education level, the moderator analysis showed that the level of effect of self-regulation on student achievement was statistically significant for the various sample groups. In her meta-analytic study on the relationship between self-regulation and student achievement, Dent (2013) also concluded that there is a significant variation across the education levels. However, in the current study the preschool level has the highest effect size, while in Dent's (2013) study it is the elementary school level that has the highest effect size. Research on young children has also shown that the early development of self-regulation skills in preschool children enhances the development of academic abilities (Blair and Razza 2007). The correlation between self-regulation and achievement seems to go down through the upper grades in this study. King et al. (2013) argue that the children's self-regulatory abilities continue to improve from childhood to well into early adulthood and conclude that there is "rank order shuffling" in self-regulation when the studies in the literature have been taken into consideration. Dent (2013), however, noted that the development of self-regulated learning occurs rapidly through the adolescent years, hence it is expected that the relationship between self-regulation and achievement will be more powerful in the upper school levels. Hence, there is a contradiction, that while in the studies we see stronger connection between self-regulation and achievement in the upper school levels, in other studies, including the current one, this connection was stronger for the lower levels.. Since the teachers' expectations about the ability of younger students to behave autonomously might be low, teachers might have the tendency to give higher grades to these students even for little effort. In parallel with our findings, Dent (2013) also justifies her results highlighting that teachers may evaluate more favorably the students who are better able to regulate their behavior than the students who are less able to do so.

A further variable which was considered as a moderator variable in the study was the publication year of the studies. According to the findings, the publication year was a significant moderator in the effect of self-regulation on student achievement. The findings of this moderator variable analysis suggest that the effect sizes of the studies increase across the years, and the largest effect size is found among the studies published between 2011 and 2016. This might be the result of the increase in the number of studies focusing on fostering self-regulated learning among the students, which in turn draws attention to how the students can employ the self-regulation strategies. Dignath et al. (2008) revealed in their meta-analysis study the noteworthy impact of interventions teaching self-regulation strategies on t students' achievement.

Furthermore, the country variable has been found to play a moderator role in the effect of self-regulation on student achievement. The sample groups chosen from vertical-collectivist countries had a higher level of effect than the horizontal-individualist countries. This may be the result of the properties or the characteristics of these types of countries; people in the vertical-collectivist countries focus on enhancing the cohesion of the country and supporting their in-groups, while people in the horizontal-individualist countries tend to express their uniqueness and self-reliance (Shavitt et al. 2011). Taking into consideration that self-regulatory skills are highly teachable (Dignath et al. 2008; Whitebread and Basilio 2012), the teachers, parents and even students themselves in vertical-collectivist countries may put more effort in teaching to students these skills compared to teachers and parents in horizontal-collectivist countries. In their systematic review of parents' role on the self-regulation abilities of the children, Pino-Pasternak and Whitebread (2010) have concluded that the self-regulated learning skill of children are to a great extent related to the characteristics and behaviors of parents.

On the other hand, the school subject variable was not found to play a moderator role in the effect of self-regulation on student achievement. However, there was an observable difference between the effect size of psychology course and the effect sizes of the other courses. The psychology course has been found to have a larger effect size than the other courses, while the rest of the courses have similar effect sizes. However, Dent (2013) found that the average correlation between the self-regulation and achievement varied significantly across different academic subjects. Her findings on the construct definition meta-analysis were similar in that she found the largest correlation in social studies. However, her results on both the construct label and the measure which showed a strongest correlation for mathematics contradict with this study's findings. Dent (2013) suggests that highly structured tasks have a clearer linear procedure resulting in the embedment of the regulation processes within the task structure, hence the lessons including these kinds of tasks may require less self-regulation. In support with her view, Lodewyk et al. (2009) claim that unstructured tasks may encourage self-regulation behaviors, even resulting in a better achievement. This kind of argument may shed a light on the variation of the influence of self-regulation on student achievement across different subject areas.

Bringing together the quantitative results of a variety of studies published in a wide range of years, the current study displays important findings that can be summarized as below:

- Self-regulation has a low level positive effect on student achievement [$r = .26$],
- Publication type, sample group (education level), country and publication year have been found to be moderator variables for the relationship between the expectation and student achievement, while the school subject does not have a moderator role in this relationship.

As a result of this meta-analytic research which reveals the relationship between the self-regulation and achievement, teachers may be suggested to organize their teaching accordingly and help the students develop self-regulated behaviors. Such interventions may have a quite important effect on educational outcomes.

References

Note. "*" References marked with an asterisk indicate studies included in the meta-analysis. The in-text citations to studies selected for meta-analysis are not followed by asterisks.

Abar, B., Carter, K. L., & Winsler, A. (2009). The effects of maternal parenting style and religious commitment on self-regulation, academic achievement, and risk behavior among African-American parochial college students. *Journal of Adolescence, 32*(2), 259–273.*

Abry, D. A. (1998). *A structural model of self-regulatory behavior and college student achievement* (Doctoral dissertation). The Florida State University, ProQuest Dissertations Publishing (UMI Number: 9839754).*

Acun, İ. (2014). Web-supported effective human rights, democracy and citizenship education? *Computers & Education, 70*, 21–28.

Adkins, S. J. (2006). *The relations of self-regulated learning to public speaking anxiety and achievement* (Doctoral Dissertation). University of Houston, ProQuest Dissertations Publishing (UMI Number: 3222118).*

Allan, D. M., Allan, N. P., Lerner, M. D., Farrington, A. L., & Lonigan, C. J. (2015). Identifying unique components of preschool children's self-regulatory skills using executive function tasks and continuous performance test. *Early Childhood Research Quarterly, 32*, 40–50.*

Alston-Abel, N. L. (2009). *Longitudinal trends in relationships among home literacy practices, children's self-regulation, and literacy achievement outcomes* (Doctoral dissertation). University of Washington, ProQuest Dissertations Publishing (UMI Number: 3370454).*

Artino, A. R. (2008). *Learning online: Understanding academic success from a self-regulated learning perspective* (Doctoral dissertation). University of Connecticut, ProQuest Dissertations Publishing (UMI Number: 3313263).*

Baker, L., & Beall, L. C. (2008). Metacognitive processes in reading comprehension. In S. E. Israel & G. G. Duffy (Eds.), *Handbook of research on reading comprehension* (pp. 373–388). New York: Routledge.

Baker, L., & Brown, A. L. (1984). Metacognitive skills and reading. In P. D. Pearson, R. Barr, M. L. Kamil, & P. Mosenthal (Eds.), *Handbook of research in reading* (pp. 353–395). New York: Longman.

Banarjee, P., & Kumar, K. (2014). A Study on self-regulated learning and academic achievement among the science graduate students. *International Journal of Multidisciplinary Approach & Studies, 1*(6), 329–342.*

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice Hall.

Bandura, A. (1989). Social cognitive theory. In R. Vasta (Ed.), *Annals of child development: Six theories of child development* (Vol. 6, pp. 1–60). Greenwich, CT: JAI Press.

Bandura, A. (2001). Social cognitive theory of mass communication. *Mediapsychology, 3,* 265–299.

Bartels, J. M., & Magun-Jackson, S. (2009). Approach–avoidance motivation and metacognitive self-regulation: The role of need for achievement and fear of failure. *Learning & Individual Differences, 19*(4), 459–463.*

Bartels, J. M., Magun-Jackson, S., & Kemp, A. D. (2009). Volitional regulation and self-regulated learning: An examination of individual differences in approach-avoidance achievement motivation. *Electronic Journal of Research in Educational Psychology, 7*(2), 605–626.*

Bartels, J. M., Magun-Jackson, S., & Ryan, J. J. (2010). Dispositional approach-avoidance achievement motivation and cognitive self-regulated learning: The mediation of achievement goals. *Individual Differences Research, 8*(2), 97–110.*

Bates, C. H. (2006a). *The effects of self-regulated learning strategies on achievement, control beliefs about learning, and intrinsic goal orientation* (Doctoral Dissertation). University of South Alabama, ProQuest Dissertations Publishing (UMI Number: 3218874).*

Bates, C. H. (2006b). *The effects of self-regulated learning strategies on achievement, control beliefs about learning, and intrinsic goal orientation* (Doctoral Dissertation). University of South Alabama, ProQuest Dissertations Publishing (UMI Number: 32).*

Becker, D. R., McClelland, M. M., Loprinzi, P., & Trost, S. G. (2014). Physical activity, self-regulation, and early academic achievement in preschool children. *Early Education & Development, 25*(1), 56–70.*

Becker, D. R., Miao, A., Duncan, R., & McClelland, M. M. (2014). Behavioral self-regulation and executive function both predict visuomotor skills and early academic achievement. *Early Childhood Research Quarterly, 29*(4), 411–424.*

Bell, P. D. (2006). *Can factors related to self-regulated learning and epistemological beliefs predict learning achievement in undergraduate asynchronous Web-based courses?* (Doctoral Dissertation). North Carolina State University, ProQuest Dissertations Publishing (UMI Number: 3233020).*

Bembenutty, H. (2005). *Predicting homework completion and academic achievement: The role of motivational beliefs and self-regulatory processes* (Doctoral dissertation). City University of New York, ProQuest Dissertations Publishing (UMI Number: 3159198).*

Bembenutty, H., & White, M. C. (2013). Academic performance and satisfaction with homework completion among college students. *Learning and Individual Differences, 24,* 83–88.*

Bembenutty, H., White, M. C., & Velez, M. R. (2015). *Developing self-regulation of learning and teaching skills among teacher candidates*. Dordrecht: Springer.

Berger, A. (2011). *Self-regulation: Brain, cognition, and development*. Washington, DC: APA.

Berhenke, A., Miller, A. L., Brown, E., Seifer, R., & Dickstein, S. (2011). Observed emotional and behavioral indicators of motivation predict school readiness in Head Start graduates. *Early Childhood Research Quarterly, 26,* 430–441.*

Bernacki, M. L., Byrnes, J. P., & Cromley, J. G. (2012). The effects of achievement goals and self-regulated learning behaviors on reading comprehension in technology enhanced learning environments. *Contemporary Educational Psychology, 37,* 148–161.*

Bertrams, A., & Dickhauser, O. (2009). High school students need for cognition self-control capacity and school achievement: Testing a mediation hypothesis. *Learning and Individual Differences, 19,* 135–138.*

Bidjerano, T., & Dai, D. Y. (2007). The relationship between the big five model of personality and self-regulated learning strategies. *Learning and Individual Differences, 17,* 69–81.*

Blair, C., & Razza, R. P. (2007). Relating effortful control, executive function, and false belief understanding to emerging math and literacy abilities in kindergarten. *Child Development, 78* (2), 647–663.

Boekaerts, M. (1997). Self-regulated learning: A new concept embraced by researchers, policy makers, educators, teachers, and students. *Learning and Instruction, 7*(2), 161–186.

Borenstein, M., Hedges, L. V., Higgins, J. P. T., & Rothstein, H. R. (2009). *Introduction to Meta-Analysis*. UK: Wiley.

Briley, J. S. (2007). *An investigation of the relationships among mathematical beliefs, self-regulation, and achievement for university-level mathematics students* (Doctoral dissertation). The University of Alabama, ProQuest Dissertations Publishing (UMI Number: 3313697).*

Briley, J. S., Thompson, T., & Iran-Nejad, A. (2009). Mathematical beliefs, self-regulation, and achievement by university students in remedial mathematics courses. *Research in the Schools, 16*(2), 15–28.*

Brock, L. L., Rimm-Kaufman, S. E., & Wanless, S. B. (2014). Delay of gratification in first grade: The role of instructional context. *Learning and Individual Differences, 29,* 81–88.*

Brown, A. L. (1978). Knowing when, where, and how to remember: A problem of metacognition. In R. Glaser (Ed.), *Advances in instructional psychology* (pp. 77–165). Hillsdale, NJ: Erlbaum.
Burić, I., & Sorić, I. (2012). The role of test hope and hopelessness in self-regulated learning: Relations between volitional strategies, cognitive appraisals and academic achievement. *Learning & Individual Differences, 22*(4), 523–529.*
Butler, D. L., & Winne, P. H. (1995). Feedback and self-regulated learning: A theoretical synthesis. *Review of Educational Research, 65,* 245–281.
Calero, F. R. (2012). *Fifth-grade English language learner academic self-concept, student-teacher relationships, self-regulated learning, parental academic support, native language support, interest, usage, proficiency and academic achievement* (Doctoral Dissertation). Dowling College, ProQuest Dissertations Publishing (UMI Number: 3528361).*
Campbell, K. D. Y. (2013). *The effects of self-regulated learning on community college students' metacognition and achievement in developmental math courses* (Doctoral Dissertation). Old Dominion University, ProQuest Dissertations Publishing (UMI Number: 3575218).*
Caraher, P. J. (2010). *Teacher survey of the relationship between student self-regulation and achievement among students with and without disabilities in an urban setting* (Doctoral dissertation). Teachers College, Columbia University, ProQuest Dissertations Publishing (UMI Number: 3425025).*
Carroll, A., Houghton, S., Wood, R., Unsworth, K., Hattie, J., Gordon, L., & Bower, J. (2009). Self efficacy and academic achievement in Australian high school students: The mediating effects of academic aspirations and delinquency. *Journal of Adolescence, 32,* 797–817.*
Cekolin, C. H. (2001). *The effect of self-regulated learning strategy instruction on strategy use and academic achievement* (Doctoral Dissertation). University of South Alabama, ProQuest Dissertations Publishing (UMI Number: 9999814).*
Cerda, C. A., Im, M. H., & Hughes, J. N. (2014). Learning related skills and academic achievement in academically at risk first graders. *Journal of Applied Developmental Psychology, 35*, 433–443.*
Çetin, B. (2015). Academic motivation and self-regulated learning in predicting academic achievement in college. *Journal of International Education Research, 11*(2), 95–106.*
Cheng, G., & Chau, J. (2013). Exploring the relationship between students' self-regulated learning ability and their ePortfolio achievement. *Internet & Higher Education, 17,* 9–15.*
Cigdem, H. (2015). How does self-regulation affect computer-programming achievement in a blended context? *Contemporary Educational Technology, 6*(1), 19–37.*
Cleary, T. J., & Zimmerman, B. J. (2004). Self-regulation empowerment program: A school-based program to enhance self-regulated and self-motivated cycles of student learning. *Psychology in the Schools, 41*(5), 537–550.
Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Hillside, NJ: Lawrence Erlbaum Associates.
Corkin, D. M., Yu, S. L., & Lindt, S. F. (2011). Comparing active delay and procrastination from a self regulated learning perspective. *Learning and Individual Differences, 21*(5), 602–606.*
Creason, L. M. (2005). *Relationships among community college developmental reading students' self-regulated learning, Internet self-efficacy, reading ability and achievement in blended/hybrid and traditional classes: A program review* (Doctoral Dissertation). University of Missouri - Kansas City, ProQuest Dissertations Publishing (UMI Number: 3199226).*
Day, S. L. (2012). *Examining the relations between self-regulation and academic achievement in third grade students* (Doctoral dissertation). The Florida State University, ProQuest Dissertations Publishing (UMI Number: 3551128).*
Day, S. L., Connor, C. M., & McClelland, M. M. (2015). Children's behavioral regulation and literacy: The impact of the first grade classroom environment. *Journal of School Psychology, 53,* 409–428.*
de la Fuente, J., Zapata, L., Martínez-Vicente, J. M. Sander, P., & Cardelle-Elawar, M. (2015). The role of personal self-regulation and regulatory teaching to predict motivational-affective variables, achievement, and satisfaction: A structural model. *Frontiers in Psychology, 6,* 1–16.*

del Rio-Parent, L. (1999). *Using structural equation modeling to assess the psychometric properties of an instrument and the validity of achievement goal theory to predict mastery goal orientation and self-regulation* (Doctoral dissertation). The University of Connecticut, ProQuest Dissertations Publishing (UMI Number: 9946735).*

Denham, S. A., Bassett, H. H., Way, E., Mincic, M., Zinsser, K., & Graling, K. (2012). Preschoolers' emotion knowledge: Self-regulatory foundations, and predictions of early school success. *Cognition & Emotion, 26*(4), 667–679.*

Dent, A. L. (2013). *The relation between self-regulation and academic achievement: A meta-analysis exploring variation in the way constructs are labeled, defined, and measured* (Doctoral dissertation). Durham, NC, USA: Duke University.

DiBenedetto, M. K., & Zimmerman, B. J. (2013). Construct and predictive validity of microanalytic measures of students self regulation of science learning. *Learning and Individual Differences, 26,* 30–41.*

Dignath, C., Buettner, G., & Langfeldt, H.-P. (2008). How can primary school students learn self-regulated learning strategies most effectively? A meta-analysis of self-regulation training programmes. *Educational Research Review, 3,* 101–129.

Dinsmore, D. L., Alexander, P. A., & Loughlin, S. M. (2008). Focusing the conceptual lens on metacognition, self-regulation, and self-regulated learning. *Educational Psychology Review, 20,* 391–409.

Duffy, M. C., & Azevedo, R. (2015). Motivation matters: Interactions between achievement goals and agent scaffolding for self-regulated learning within an intelligent tutoring system. *Computers in Human Behavior, 52,* 338–348.*

Duke, B. L. (2003). *The influence of using cognitive strategy instruction through writing rubrics* on *high school students' writing self-efficacy, achievement goal orientation, perceptions of classroom goal structures, self-regulation, and writing achievement* (Doctoral dissertation). University of Oklahoma, ProQuest Dissertations Publishing (UMI Number: 3109071).*

Duru, E., Duru, S., & Balkıs, M. (2014). Analysis of relationships among burnout, academic achievement, and self-regulation. *Educational Sciences: Theory & Practice, 14*(5), 1274–1284.*

Edsall, C. R. (2012). *The relationship between the use of self-regulatory learning strategies and academic achievement among undergraduate science and nonscience students* (Doctoral dissertation). Capella University, ProQuest Dissertations Publishing (UMI Number: 3546660).*

Eilam, B., Zeidner, M., Aharon, I. (2009). Student conscientiousness, self-regulated learning, and science achievement: An explorative field study. *Psychology in the Schools, 46*(5), 420–432.*

El Nokali, N. E. (2011). *The intersection of physical activity, self-regulation and academic achievement: Implications for educational success* (Doctoral dissertation). University of Pittsburgh, ProQuest Dissertations Publishing (UMI Number: 3501402).*

Eom, W. (1999). *The effects of self-regulated learning strategy on academic achievement in a* computer-*networked hypertext/hypermedia learning environment* (Doctoral Dissertation). The Florida State University, ProQuest Dissertations Publishing (UMI Number: 9923684).*

Eshel, Y., & Kohavi, R. (2003). Perceived classroom control, self-regulated learning strategies, and academic achievement. *Educational Psychology, 23*(3), 249–260.*

Evans, G. W., & Rosenbaum, J. (2008). Self-regulation and the income-achievement gap. *Early Childhood Research Quarterly, 23(*4), 504–514.*

Flavell, J. H. (1976). Metacognitive aspects of problem solving. In L. B. Resnick (Ed.), *The nature of intelligence* (pp. 231–235). Hillsdale, NJ: Erlbaum.

Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive developmental inquiry. *American Psychologist, 34*(10), 906–911.

Garavalia, L. S., & Gredler, M. E. (2002). An exploratory study of academic goal setting, achievement calibration and self-regulated learning. *Journal of Instructional Psychology, 29*(4), 221.*

Garrido-Vargas, M. (2012). *Relationship of self-regulated learning and academic achievement among English language learners* (Doctoral Dissertation). The University of Arizona, ProQuest Dissertations Publishing (UMI Number: 3526417).*

Gaythwaite, E. S. (2006). *Metacognitive self-regulation, self-efficacy for learning and performance, and critical thinking as predictors of academic success and course retention among community college students enrolled in online, telecourse, and traditional public speaking courses* (Doctoral dissertation). University of Central Florida, ProQuest Dissertations Publishing (UMI Number: 3210356).*

Geddes, D. (2009). How am I doing? Exploring on-line gradebook monitoring as a self-regulated learning practice that impacts academic achievement. *Academy of Management Learning & Education, 8*(4), 494–510.*

Gendron, A. L. (2011). *Active procrastination, self-regulated learning and academic achievement in university undergraduates* (Master's thesis). University of Victoria (Canada), ProQuest Dissertations Publishing (UMI Number: MR82477).*

Gestsdottir, S., von Suchodoletz, A., Wanless, S. B., Hubert, B., Guimard, P., Birgisdottir, F., et al. (2014). Early behavioral self-regulation, academic achievement, and gender: Longitudinal findings from France, Germany, and Iceland. *Applied Developmental Science, 18*(2), 90–109.*

Gramlich, S. P. (2010). *Regression analyses of self-regulatory concepts to predict community college math achievement and persistence* (Doctoral dissertation). Rutgers The State University of New Jersey–New Brunswick, ProQuest Dissertations Publishing (UMI Number: 3412292).*

Hall, N. C. (2008). Self-regulation of primary and secondary control in achievement settings: A process model. *Journal of Social & Clinical Psychology, 27*(10), 1126–1164.*

Halloran, R. K. (2011). *Self-regulation, executive function, working memory, and academic achievement of female high school students* (Doctoral dissertation). Fordham University, ProQuest Dissertations Publishing (UMI Number: 3452791).*

Heastie, S. R. (2001). *Relationships and differences on self-regulated learning, parental involvement, homework, and academic achievement, among high school students in rural West Virginia* (Doctoral Dissertation). West Virginia University, ProQuest Dissertations Publishing (UMI Number: 3014941).*

Hedges, L. V., & Olkin, I. (1985). *Statistical method for meta-analysis*. United Kingdom: Academic Press.

Helle, L., Laakkonen, E., Tuijula, T., & Vermunt, J. D. (2013). The developmental trajectory of perceived self-regulation, personal interest, and general achievement throughout high school: a longitudinal study. *The British Journal of Educational Psychology, 83,* 252–266.*

Heller, M. L. (2015). *Predicting first-year college achievement: Evaluation of a self-regulatory coping model* (Doctoral dissertation). Ball State University, ProQuest Dissertations Publishing (UMI Number: 3716069).*

Herndon, J. S., & Bembenutty, H. (2014). In school and social factors influencing learning among students enrolled in a disciplinary alternative school. *Learning and Individual Differences, 35,* 49–55.*

Highley, D. C. (1994). *The effects of a "learning to learn" course on at risk students' motivation, self-regulated learning processes and academic achievement* (Doctoral Dissertation). University of Southern California, ProQuest Dissertations Publishing (UMI Number: DP25563).*

Hodges, C. B., Stackpole-Hodges, C. L., & Cox, K. M. (2008). Self-efficacy, self-regulation, and cognitive style as predictors of achievement with podcast instruction. *Journal of Educational Computing Research, 38*(2), 139–153.*

Howell, A. J., & Watson, D. C. (2007). Procrastination: Associations with achievement goal orientation and learning strategies. *Personality and Individual Differences, 43,* 167–178.*

Howse, R. B. (1999). *Motivation and self-regulation as predictors of achievement in economically disadvantaged young children* (Doctoral dissertation). The University of North Carolina at Greensboro, ProQuest Dissertations Publishing (UMI Number: 9933845).*

Howse, R. B., Lange, G., Farran, D. C., & Boyles, C. D. (2003). Motivation and self-regulation as predictors of achievement in economically disadvantaged young children. *Journal of Experimental Education, 71*(2), 151–174.*

Hsiang-Ann, L., Ferdenzi, A. C., & Edlin, M. (2012). Motivation, self-regulated learning efficacy, and academic achievement among international and domestic students at an urban community college: A comparison. *Community College Enterprise, 18*(2), 9–38.*

Hsu, J. T. S. (1997). *Value, expectancy, metacognition, resource management, and academic achievement: A structural model of self-regulated learning in a distance education context* (Doctoral Dissertation). University of Southern California, ProQuest Dissertations Publishing (UMI Number: 9835152).*

Hur, E., Buettner, C., & Jeon, L. (2015). The association between teachers' child-centered beliefs and children's academic achievement: The indirect effect of children's behavioral self-regulation. *Child & Youth Care Forum, 44*(2), 309–325.*

Inan, B. (2013). The relationship between self-regulated learning strategies and academic achievement in a Turkish EFL setting. *Educational Research and Reviews, 8*(17), 1544–1550.*

Ivcevic, Z., & Brackett, M. (2014). Predicting school success: Comparing conscientiousness, grit and emotion regulation ability. *Journal of Research in Personality, 52*, 29–36.*

Jackson, S. F. J. (2012). *Self-regulated and communal learning contexts as they relate to math achievement and math self-efficacy among African American elementary level students* (Doctoral Dissertation). Howard University, ProQuest Dissertations Publishing (UMI Number: 3591948).*

Jenkins, J. S. (2009). *The effects of explicit self-regulated learning strategy instruction on mathematics achievement* (Doctoral Dissertation). The University of North Carolina at Charlotte, ProQuest Dissertations Publishing (UMI Number: 3388967).*

Jones, K. K., & Byrnes, J. P. (2006). Characteristics of students who benefit from high-quality mathematics instruction. *Contemporary Educational Psychology, 31*, 328–343.*

Kadhiravan, S. (2012). Self-regulated learning of adolescents in relation to their achievement motivation. *Journal of Psychosocial Research, 7*(2), 211–218.*

Kaplan, A. (2008). Clarifying metacognition, self-regulation, and self-regulated learning: What's the purpose? *Educational Psychology Review, 20,* 477–484.

Karoly, P. (1993). Mechanisms of self-regulation: A systems view. *Annual Review of Psychology, 44*(1), 23–52.

Kehl, V. A. (2015). *A study to examine the relationship between self-regulatory resource management strategies and academic achievement in student veterans with PTSD symptoms* (Master's Thesis). California State University, ProQuest Dissertations Publishing (UMI Number: 1602387).*

Kim, K. Y. (1992). *The effects of types of instructional control and levels of self-regulatory skills on achievement and retention from a developmental perspective* (Doctoral dissertation). The Florida State University, ProQuest Dissertations Publishing (UMI Number: 9303351).*

Kimber, C. T. (2009). *The effect of training in self-regulated learning on math anxiety and achievement among preservice elementary teachers in a freshman course in mathematics concepts* (Doctoral Dissertation). Temple University, ProQuest Dissertations Publishing (UMI Number: 3359748).*

King, K. M., Lengua, L. J., & Monahan, K. C. (2013). Individual differences in the development of self-regulation during pre-adolescence: Connections to context and adjustment. *Journal of Abnormal Child Psychology, 41*(1), 57–69.

Kingir, S., Tas, Y., Gok, G., & Vural, S. S. (2013). Relationships among constructivist learning environment perceptions, motivational beliefs, self-regulation and science achievement. *Research in Science & Technological Education, 31*(3), 205–226.*

Kırmızı, Ö. (2015). The interplay among academic self-concept, self-efficacy, self-regulation and academic achievement of higher education L2 learners. *Journal of Higher Education & Science, 5*(1), 32–40.*

Kitsantas, A. (2002). Test preparation and test performance: A self-regulatory analysis. *The Journal of Experimental Education, 70,* 101–113.

Kitsantas, A., Steen, S., & Huie, F. (2009). The role of self-regulated strategies and goal orientation in predicting achievement of elementary school children. International Electronic *Journal of Elementary Education, 2*(1), 65–81.*

Kitsantas, A., Winsler, A., & Huie, F. (2008). Self-regulation and ability predictors of academic success during college: A predictive validity study. *Journal of Advanced Academics, 20*(1), 42–68.*

Kitsantas, A., & Zimmerman, B. J. (2009). College students' homework and academic achievement: The mediating role of self-regulatory beliefs. *Metacognition & Learning, 4*(2), 97–110.*

Kleitman, S., & Gibson, J. (2011). Metacognitive beliefs self-confidence and primary learning environment of sixth grade students. *Learning and Individual Differences, 21,* 728–735.*

Knouse, L. E., Feldman, G., & Blevins, E. J. (2014). Executive functioning difficulties as predictors of academic performance: Examining the role of grade goals. *Learning and Individual Differences, 36*, 19–26.*

Kolovelonis, A., Goudas, M., & Dermitzaki, I. (2011). The effect of different goals and self-recording on self-regulation of learning a motor skill in a physical education setting. *Learning and Instruction, 21*(3), 355–364.

Komarraju, M., & Nadler, D. (2013). Self-efficacy and academic achievement: Why do implicit beliefs, goals, and effort regulation matter? *Learning and Individual Differences, 25*, 67–72.*

Kozlowski, S. W., & Bell, B. S. (2006). Disentangling achievement orientation and goal setting: effects on self-regulatory processes. *The Journal of Applied Psychology, 91*(4), 900–916.*

Kulinskaya, E., Morgenthaler, S., & Staudte, R. G. (2008). *Meta-analysis: A guide to calibrating and combining statistical evidence*. London: Wiley.

Kumrow, D. E. (2005). *A pilot study to investigate the relationship between student self-regulatory resource management strategies and academic achievement in a Web-based hybrid graduate nursing course* (Doctoral dissertation). University of Southern California, ProQuest Dissertations Publishing (UMI Number: 3180478).*

Lee, H. (2016). Which feedback is more effective for pursuing multiple goals of differing importance? The interaction effects of goal importance and performance feedback type on self-regulation and task achievement. *Educational Psychology, 36*(2), 297–322.*

Lee, H. W. (2008). *The effects of generative learning strategy prompts and metacognitive feedback on learners' self-regulation, generation process, and achievement* (Doctoral dissertation). The Pennsylvania State University, ProQuest Dissertations Publishing (UMI Number: 3431418).*

Lee, J., Yu, H., & Choi, S. (2012). The influences of parental acceptance and parental control on school adjustment and academic achievement for South Korean children: the mediation role of self-regulation. *Asia Pacific Education Review, 13*(2), 227–237.*

Lee, W., Lee, M. J., & Bong, M. (2014). Testing interest and self-efficacy as predictors of academic self-regulation and achievement. *Contemporary Educational Psychology, 39*(2), 86–99.*

León, J., Núñez, J. L., & Liew, J. (2015). Self-determination and STEM education: Effects of autonomy, motivation, and self-regulated learning on high school math achievement. *Learning & Individual Differences, 43*, 156–163.*

Liao, H. A., Ferdenzi, A. C., & Edlin, M. (2012). Motivation, self-regulated learning efficacy, and academic achievement among international and domestic students at an urban community college: A comparison. *The Community College Enterprise, 18*(2), 9–38.*

Liew, J., Chen, Q., & Hughes, J. N. (2010). Child effortful control teacher-student relationships and achievement in academically at-risk children: Additive and interactive effects. *Early Childhood Research Quarterly, 25*, 51–64.*

Liew, J., McTigue, E. M., Barrois, L., & Hughes, J. N. (2008). Adaptive and effortful control and academic self-efficacy beliefs on achievement: A longitudinal study of 1st through 3rd graders. *Early Childhood Research Quarterly, 23*, 515–526.*

Lindsey Randall, A. K. (2008). *The effect of reading self-efficacy, expectancy-value, and metacognitive self-regulation on the achievement and persistence of community college*

students enrolled in basic skills reading courses (Doctoral dissertation). University of Southern California, ProQuest Dissertations Publishing (UMI Number: 3325157).*
Lodewyk, K. R., Winne, P. H., & Jamieson-Noel, D. L. (2009). Implication of task structure on self-regulated learning and achievement. *Educational Psychology, 29*(1), 1–25.
Lopez, D. F. (1999). Social cognitive influences on self-regulated learning: The impact of action-control beliefs and academic goals on achievement-related outcomes. *Learning & Individual Differences, 11*(3), 301–319.*
Luo, W., Paris, S. G., Hogan, D., & Luo, Z. (2011). Do performance goals promote learning? A pattern analysis of Singapore students achievement goals. *Contemporary Educational Psychology, 36*, 165–176.*
Major, A., Martinussen, R., & Wiener, J. (2013). Self-efficacy for self-regulated learning in adolescents with and without attention deficit hyperactivity disorder (ADHD). *Learning and Individual Differences, 27*, 149–156.*
Malpass, J. R. (1994). *A structural model of self-efficacy, goal orientation, worry, self-regulated learning, and high-stakes mathematics achievement* (Doctoral Dissertation). University of Southern California, ProQuest Dissertations Publishing (UMI Number: 9601023).*
Maslin, L. L. Y. Y. (1997). *Self-regulated learning and science achievement in a community college* (Doctoral Dissertation). University of Southern California, ProQuest Dissertations Publishing (UMI Number: 9733096).*
Matthews, J. S., Marulis, L. M., & Williford, A. P. (2014). Gender processes in school functioning and the mediating role of cognitive self-regulation. *Journal of Applied Developmental Psychology, 35*, 128–137.*
McCaig, K. A. (1990). *Self-regulatory learning processes and academic achievement of high-risk students in higher education* (Doctoral dissertation). The Florida State University, ProQuest Dissertations Publishing (UMI Number: 9024102).*
McClain, E. K. (2015). *The effects of the use of a self-monitoring form on achievement and self-regulated learning in a developmental mathematics course* (Doctoral Dissertation). University of Kansas, ProQuest Dissertations Publishing (UMI Number: 3713602).*
McClelland, M. M., & Cameron, C. E. (2011). Self-Regulation in early childhood: Improving conceptual clarity and developing ecologically valid measures. *Child Development Perspectives, 6*(2), 136–142.
McGhee, R. M. H. (2010). *Asynchronous interaction, online technologies self-efficacy and self-regulated learning as predictors of academic achievement in an online class* (Doctoral Dissertation). Southern University and Agricultural and Mechanical College, ProQuest Dissertations Publishing (UMI Number: 3453755).*
Merki, K. M. (2011). Effects of the implementation of state wide exit exams on students self-regulated learning. *Studies in Educational Evaluation, 37*, 196–205.*
Middleton, M. J., & Midgley, C. (2002). Beyond motivation: Middle school students' perceptions of press for understanding in math. *Contemporary Educational Psychology, 27*, 373–391.*
Miller, R. B., Greene, B. A., Montalvo, G. P., Ravindran, B., & Nichols, J. D. (1996). Engagement in academic work: The role of learning goals future consequences pleasing others and perceived ability. *Contemporary Educational Psychology, 21*, 388–422.*
Mistry, R. S., Benner, A. D., Biesanz, J. C., Clark, S. L., & Howes, C. (2010). Family and social risk and parental investments during the early childhood years as predictors of low-income children's school readiness outcomes. *Early Childhood Research Quarterly, 25*, 432–449.*
Monetti, D. M. (2001). *A multiple regression analysis of self-regulated learning, epistemology, and student achievement* (Doctoral Dissertation). The Florida State University, ProQuest Dissertations Publishing (UMI Number: 3028477).*
Montroy, J. J., Bowles, R. P., Skibbe, L. E., & Foster, T. D. (2014). Social skills and problem behaviors as mediators of the relationship between behavioral self-regulation and academic achievement. *Early Childhood Research Quarterly, 29*(3), 298–309.*
Moreira, P. A., Oliveira, J. T., Cloninger, K. M., Azevedo, C., Sousa, A., Castro, J., et al. (2012). The psychometrics and validity of the junior temperament and character inventory in Portuguese adolescents. *Comprehensive Psychiatry, 53,* 1227–1236.*

Muis, K. R., & Franco, G. M. (2009). Epistemic beliefs: Setting the standards for self-regulated learning. *Contemporary Educational Psychology, 34,* 306–318.*

Muis, K. R., Pekrun, R., Sinatra, G. M., Azevedo, R., Trevors, G., Meier, E., et al. (2015). The curious case of climate change: Testing a theoretical model of epistemic beliefs epistemic emotions and complex learning. *Learning and Instruction, 39,* 168–183.*

Muis, K. R., Psaradellis, C., Lajoie, S. P., Di Leo, I., & Chevrier, M. (2015). The role of epistemic emotions in mathematics problem solving. *Contemporary Educational Psychology, 42*, 172–185.*

Murrah, W. M. (2010). *Comparing self-regulatory and early academic skills as predictors of later math, reading, and science elementary school achievement* (Doctoral dissertation). University of Virginia, ProQuest Dissertations Publishing (UMI Number: 3435992).*

Nandagopal, K., & Ericsson, K. A. (2012). An expert performance approach to the study of individual differences in self-regulated learning activities in upper-level college students. *Learning and Individual Differences, 22*, 597–609.*

Nelson, J. A. G. (2014). *Self-regulated learning, classroom context, and Achievement: A dual-method investigation* (Doctoral Dissertation). University of Minnesota, ProQuest Dissertations Publishing (UMI Number: 3635200).*

Ness, B. M., & Vroman, K. (2014). Preliminary examination of the impact of traumatic brain injury and posttraumatic stress disorder on self-regulated learning and academic achievement among military service members enrolled in postsecondary education. *The Journal of Head Trauma Rehabilitation, 29*(1), 33–43.*

Neuenschwander, R., Röthlisberger, M., Cimeli, P., & Roebers, C. M. (2012). How do different aspects of self-regulation predict successful adaptation to school? *Journal of Experimental Child Psychology, 113,* 353–371.*

Nevill, M. A. (2008). *The impact of reading self-efficacy and the regulation of cognition on the reading achievement of an intermediate elementary sample* (Doctoral dissertation). Indiana University of Pennsylvania, ProQuest Dissertations Publishing (UMI Number: 3303552).*

Ning, H. K., & Downing, K. (2010). The reciprocal relationship between motivation and self-regulation: A longitudinal study on academic performance. *Learning and Individual Differences, 20,* 682–686.*

Noria, C. W., Borkowski, J. G., & Whitman, T. L. (2009). Parental influences on self-regulation and achievement in children with adolescent mothers. *European Journal of Developmental Psychology, 6*(6), 722–745.*

Nota, L., Soresi, S., & Zimmerman, B. J. (2004). Self-regulation and academic achievement and resilience: A longitudinal study. *International Journal of Educational Research, 41*(3), 198–215.*

Nuesell, C. M. (1999). *Approach and avoidance achievement goals and self-regulated learning strategy usage* (Doctoral Dissertation). Fordham University, ProQuest Dissertations Publishing (UMI Number: 9938913).*

Owens, K. (2005). *Cyberspace versus face-to-face: The influence of learning strategies, self-regulation, and achievement goal orientation* (Doctoral dissertation). James Madison University, ProQuest Dissertations Publishing (UMI Number: 3195649).*

Pajares, F., Britner, S. L., & Valiante, G. (2000). Relation between achievement goals and self-beliefs of middle school students in writing and science. *Contemporary Educational Psychology, 25*, 406–422.*

Pajares, F., & Valiante, G. (1999). Grade level and gender differences in the writing self beliefs of middle school students. *Contemporary Educational Psychology, 24*(4), 390–405.*

Pajares, F., & Valiante, G. (2001). Gender differences in writing motivation and achievement of middle school students: A function of gender orientation? *Contemporary Educational Psychology, 26,* 366–381.*

Patrick, H. (1998). *Expanding the parameters of self-regulated learning: Relations among children's academic and social self-regulation and achievement* (Doctoral Dissertation). University of Michigan, ProQuest Dissertations Publishing (UMI Number: 9909962).*

Pelt, J. (2008). *The relationship between self-regulated learning and academic achievement in middle school students: A cross-cultural perspective* (Doctoral Dissertation). University of South Carolina, ProQuest Dissertations Publishing (UMI Number: 3351700).*

Pino-Pasternak, D., & Whitebread, D. (2010). The role of parenting in children's self-regulated learning. *Educational Research Review, 5,* 220–242.

Pintrich, P., & De Groot, E. (1990). Motivational and self-regulated learning components of classroom academic performance. *Journal of Educational Psychology, 82,* 33–40.

Pintrich, P., & Zusho, A. (2002). The development of academic self-regulation: The role of cognitive and motivational factors. In A. Wigfield & J. Eccles (Eds.), *Development of achievement motivation* (pp. 249–284). San Diego, CA: Academic Press.

Pintrich, P. R. (1995). Understanding self-regulated learning. *New Directions for Teaching and Learning, 63,* 3–12.

Pintrich, P. R., Smith, D. A. F., Garcia, T., & McKeachie, W. J. (1991). *A manual for the use of the motivated strategies learning questionnaire (MSLQ).* Ann Arbor, MI: University of Michigan, National Center for Research to Improve Postsecondary Teaching and Learning.

Puspitasari, K. (2012). *The effects of learning strategy intervention and study time management intervention on students' self-regulated learning, achievement, and course completion in a distance education learning environment* (Doctoral Dissertation). The Florida State University, ProQuest Dissertations Publishing (UMI Number: 3540208).*

Radosevich, D. J., Vaidyanathan, V. T., Yeo, S., & Radosevich, D. M. (2004). Relating goal orientation to self-regulatory processes: A longitudinal field test. *Contemporary Educational Psychology, 29*(3), 207–229.*

Radovan, M. (2010). The influence of self-regulated learning and age on success in studying. *Journal of Contemporary Educational Studies, 61*(5), 102–124.*

Rao, N., Moely, B. E., & Sachs, J. (2000). Motivational beliefs study strategies and mathematics attainment in high and low achieving chinese secondary school students. *Contemporary Educational Psychology, 25*, 287–316.*

Ray, M. W. (2003). *The role of aptitude and achievement in developmental college students' motivational beliefs, perceptions of self-regulated learning, and accuracy of grade predictions* (Doctoral Dissertation). University of Missouri—Kansas City, ProQuest Dissertations Publishing (UMI Number: 3085597).*

Roebers, C. M., Krebs, S. S., & Roderer, T. (2014). Metacognitive monitoring and control in elementary school children: Their interrelations and their role for test performance. *Learning and Individual Differences, 29*, 141–149.*

Rosário, P., Núñez, J. C. Valle, A., González-Pienda, J., & Lourenço, A. (2013). Grade level, study time, and grade retention and their effects on motivation, self-regulated learning strategies, and mathematics achievement: A structural equation model. *European Journal of Psychology of Education, 28*(4), 1311–1331.*

Rowden Quince, B. C. (2013). *The effects of self-regulated learning strategy instruction and structured-diary use on students' self-regulated learning conduct and academic success in online community-college general education courses* (Doctoral dissertation). University of San Francisco, ProQuest Dissertations Publishing (UMI Number: 3591104).*

Ruban, L. M. (2000). *Patterns of self-regulated learning and academic achievement among university students with and without learning disabilities* (Doctoral Dissertation). The University of Connecticut, ProQuest Dissertations Publishing (UMI Number: 9969087).*

Ruban, L. M., McCoach, D. B., McGuire, J. M., & Reis, S. M. (2003). The differential impact of academic self-regulatory methods on academic achievement among university students with and without learning disabilities. *Journal of Learning Disabilities, 36*(3), 270–286.*

Sadi, O., & Uyar, M. (2013). The relationship between self-efficacy, self-regulated learning strategies and achievement: A path model. *Journal of Baltic Science Education, 12*(1), 21–33.*

Sanz de Acedo Lizarraga, M. L., Ugarte, M. D., Iriarte, M. D., & Sanz de Aedo Baquedano, M. T. (2003). Immediate and long-term effects of a cognitive intervention on intelligence, self-regulation, and academic achievement. *European Journal of Psychology of Education, 18*(1), 59–74.*

Schmitt, S. A., McCelland, M. M., Tominey, S. L., & Acock, A. C. (2015). Strengthening school readiness for Head Start children: Evaluation of a self-regulation intervention. *Early Childhood Research Quarterly, 30*, 20–31.*

Schmitt, S. A., Pratt, M. E., & McClelland, M. M. (2014). Examining the validity of behavioral self-regulation tools in predicting preschoolers' academic achievement. *Early Education & Development, 25*(5), 641–660.*

Schraw, G., Crippen, K. J., & Hartley, K. (2006). Promoting self-regulation in science education: Metacognition as part of a broader perspective on learning. *Research in Science Education, 36,* 111–139.

Schulz, M., & Robnagel, C. S. (2010). Informal workplace learning: An exploration of age differences in learning competence. *Learning and Instruction, 20,* 383–399.*

Schunk, D. H. (1989). Self-efficacy and cognitive achievement: Implications for students with learning problems. *Journal of Learning Disabilities, 22,* 14–22.

Schunk, D. H. (2008). Metacognition, self-regulation, and self-regulated learning: Research recommendations. *Educational Psychology Review, 20*(4), 463–467.

Schunk, D. H., & Ertmer, P. A. (2000). Self-regulation and academic learning: Self-efficacy enhancing interventions. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 631–649). San Diego: Academic Press.

Schunk, D. L., & Zimmerman, B. J. (1994). *Self-regulation of learning and performance: Issues and educational applications*. Hillsdale, NJ: Erlbaum.

Schwartz, L. S. (1996). *The effects of a goal setting instructional intervention on achievement, goal setting habits, and self-efficacy for self-regulated learning* (Doctoral Dissertation). University of South Carolina, ProQuest Dissertations Publishing (UMI Number: 9623120).*

Schwinger, M., & Stiensmeier-Pelster, J. (2012). Effects of motivational regulation on effort and achievement: A mediation model. *International Journal of Educational Research, 56,* 35–47.*

Schwinger, M., Steinmayr, R., & Spinath, B. (2009). How do motivational regulation strategies affect achievement: Mediated by effort management and moderated by intelligence. *Learning and Individual Differences, 19*, 621–627.*

Schwinger, M., Steinmayr, R., & Spinath, B. (2012). Not all roads lead to Rome—Comparing different types of motivational regulation profiles. *Learning and Individual Differences, 22*, 269–279.*

Sektnan, M., McCelland, M. M., Acock, A., & Morrison, F. J. (2010). Relations between early family risk, children's behavioral regulation, and academic achievement. *Early Childhood Research Quarterly, 25*, 464–479.*

Sha, L., Looi, C.-K., Chen, W., Seow, P., & Wong, L.-H. (2012). Recognizing and measuring self-regulated learning in a mobile learning environment. *Computers in Human Behavior, 28*, 718–728.*

Shavitt, S., Johnson, T. P., & Zhang, J. (2011). Horizontal and vertical cultural differences in the content of advertising appeals. *Journal of International Consumer Marketing*, *23*(3–4), 297–310.

Shell, D. F., & Husman, J. (2001). The multivariate dimensionality of personal control and future time perspective beliefs in achievement and self-regulation. *Contemporary Educational Psychology, 26*(4), 481–506.*

Shen, H. J. (2002). *Motivational and self-regulated learning components in relation to language learners' self-assessment, reading strategy use and reading achievement* (Doctoral Dissertation). Seattle Pacific University, ProQuest Dissertations Publishing (UMI Number: 3148896).*

Shores, M. L., & Shannon, D. M. (2007). The effects of self-regulation, motivation, anxiety, and attributions on mathematics achievement for fifth and sixth grade students. *School Science & Mathematics, 107*(6), 225–236.*

Sontag, C., & Stoeger, H. (2015). Can highly intelligent and high-achieving students benefit from training in self-regulated learning in a regular classroom context? *Learning and Individual Differences, 41*, 43–53.*

Sperling, R. A., Howard, B. C., Miller, L. A., & Murphy, C. (2002). Measures of children's knowledge and regulation of cognition. *Contemporary Educational Psychology, 27,* 51–79.*

Spörer, N., & Brunstein, J. C. (2009). Fostering the reading comprehension of secondary school students through peer-assisted learning: Effects on strategy knowledge, strategy use, and task performance. *Contemporary Educational Psychology, 34*, 289–297.*

Sun, J., Chang, K., & Chen, Y. (2015). GPS sensor-based mobile learning for English: An exploratory study on self-efficacy, self-regulation and student achievement. *Research & Practice in Technology Enhanced Learning, 10*(1), 1–18.*

Sundre, D., & Kitsansas, A. (2004). An exploration of the psychology of the examinee: Can examinee self-regulation and test taking motivation predict consequential and non-consequential test performance? *Contemporary Educational Psychology, 29*, 6–26.*

Sundre, D. L., & Kitsantas, A. (2004). An exploration of the psychology of the examinee: Can examinee self-regulation and test-taking motivation predict consequential and non-consequential test-performance? *Contemporary Educational Psychology, 29,* 6–26.

Taylor, A. G. (2014). *The effects of self-regulated learning planning and evaluation strategies on academic achievement in a redesigned undergraduate course (replacement model)* (Doctoral Dissertation). University of South Alabama, ProQuest Dissertations Publishing (UMI Number: 3737783).*

Tilfarlioglu, F. Y., &, Delbesoglugil, A. B. Ö. (2014). Questioning academic success through self-regulation, self-esteem and attitude in foreign language learning (a case study). *Theory and Practice in Language Studies, 4*(11), 2223–2230.*

Turan, S., & Konan, A. (2012). Self-regulated learning strategies used in surgical clerkship and the relationship with clinical achievement. *Journal of Surgical Education, 69*(2), 218–225.*

Tze, V. M. C., Daniels, L. M., & Klassen, R. M. (2014). Examining the factor structure and validity of the English Precursors to Boredom Scales. *Learning and Individual Differences, 32*, 254–260.*

Tze, V. M. C., Daniels, L. M., Klassen, R. M., Li, J. C.-H. (2013). Canadian and Chinese university students' approaches to coping with academic boredom. *Learning and Individual Differences, 23*, 32–43.*

Ursache, A., Blair, C., & Raver, C. C. (2012). The promotion of self-regulation as a means of enhancing school readiness and early achievement in children at risk for school failure. *Child Development Perspectives, 6*, 122–128.

Uzun, A. M., Unal, E., & Yamac, A. (2013). Service teachers' academic achievements in online distance education: The roles of online self-regulation and attitudes. *Turkish Online Journal of Distance Education (TOJDE), 14*(2), 131–140.*

Valentin, I. (2005). *Self-regulated executive functions in academic achievement* (Doctoral Dissertation). York University (Canada), ProQuest Dissertations Publishing (UMI Number: NR11638).*

Valiente, C., Eisenberg, N., Haugen, R., Spinrad, T. L., Hofer, C., Liew, J., et al. (2011). Children's effortful control and academic achievement: Mediation through social functioning. *Early Education & Development, 22*(3), 411–433.*

VanZile-Tamsen, C. (2001). The predictive power of expectancy of success and task value for college students' self-regulated strategy use. *Journal of College Student Development, 42*(3), 233–241.*

Vecchio, G. M., Gerbino, M., Pastorelli, C., Del Bove, G., & Caprara, G. V. (2007). Multi-faceted self-efficacy beliefs as predictors of life satisfaction in late adolescence. *Personality and Individual Differences, 43*, 1807–1818.*

Vecchione, M., Alessandri, G., & Marsicano, G. (2014). Academic motivation predicts educational attainment: Does gender make a difference? *Learning and Individual Differences, 32*, 124–131.*

Villavicencio, F. T., & Bernardo, A. B. (2013). Positive academic emotions moderate the relationship between self-regulation and academic achievement. *The British Journal of Educational Psychology, 83*, 329–340.*

Watts, J. B. (2006). *The relationships among sources of self-regulation, disposition towards mathematics, and mathematics achievement in community college students* (Doctoral dissertation). The University of Alabama, ProQuest Dissertations Publishing (UMI Number: 3223332).*

Weed, K., Keogh, D., Borkowski, J. G., Whitman, T., & Noria, C. W. (2011). Self-regulation mediates the relationship between learner typology and achievement in at-risk children. *Learning and Individual Differences, 21*, 96–108.*

Whitebread, D., & Basilio, M. (2012). The emergence and early development of self-regulation in young children. *Profesorado, 16*(1), 15–33.

Willoughby, M., Kupersmidt, J., Voegler-Lee, M., & Bryant, D. (2011). Contributions of hot and cool self-regulation to preschool disruptive behavior and academic achievement. *Developmental Neuropsychology, 36*(2), 162–180.*

Winne, P. H., & Hadwin, A. F. (1998). Studying as self-regulated learning. In D. J. Hacker, J. Dunlosky, & A. C. Graesser (Eds.), *Metacognition in educational theory and practice* (pp. 277–304). Mahwah, NJ: Lawrence Erlbaum Associates.

Winne, P. H., & Jamieson-Noel, D. (2002). Exploring students' calibration of self-reports about study tactics and achievement. *Contemporary Educational Psychology, 27*, 551–572.*

Wolters, C., & Hussain, M. (2015). Investigating grit and its relations with college students' self-regulated learning and academic achievement. *Metacognition & Learning, 10*(3), 293–311.*

Wolters, C. A. (1999). The relation between high school students motivational regulation and their use of learning strategies effort and classroom performance. *Learning and Individual Differences, 11*(3), 281–299.*

Wormington, S. V., Corpus, J. H., & Anderson, K. G. (2012). A person-centered investigation of academic motivation and its correlates in high school. *Learning and Individual Differences, 22*, 429–438.*

Wu, J.-Y. (2015). University students' Motivated Attention and use of regulation strategies on social media. *Computers and Education, 89*, 75–90.*

YangKim, S. H. (2009). *The relationship among self-regulation, internet use, and academic achievement in a computer literacy course* (Doctoral dissertation). Southern University and Agricultural and Mechanical College, ProQuest Dissertations Publishing (UMI Number: 3465185).*

Yap, E. G. (1993). *A structural model of self-regulated learning in math achievement* (Doctoral Dissertation). University of Southern California, ProQuest Dissertations Publishing (UMI Number: DP25545).*

Yigzaw, A., & Fentie, A. (2013). The impact of students' self-regulated language learning on their reading achievement in Ethiopian high schools: Grade 9 in focus. *Journal of Media and Communication Studies, 5*(5), 44–51.*

You, J. W. (2016). Identifying significant indicators using LMS data to predict course achievement in online learning. *The Internet and Higher Education, 29*, 23–30.*

Zealand, R. A. (2004). *Relationships among achievement, perceptions of control, self-regulation, and self-determination of students with and without the classification of learning disabilities* (Doctoral dissertation). Columbia University, ProQuest Dissertations Publishing (UMI Number: 3115378).*

Zimmerman, B. (2000). Self-efficacy: An essential motive to learn. *Contemporary Educational Psychology, 25,* 82–91.

Zimmerman, B. J. (1990). Self-regulating academic achievement: The emergence of a social cognitive perspective. *Educational Psychology Review, 2,* 173–201.

Zimmerman, B. J. (1995). Self-efficacy and educational development. In A. Bandura (Ed.), *Self-efficacy in changing societies* (pp. 202–231). New York: Cambridge University Press.

Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory into Practice, 41,* 64–70.

Zimmerman, B. J. (2011). Motivational sources and outcomes of self-regulated learning and performance. In B. J. Zimmerman & D. H. Schunk (Eds.), *Handbook of self-regulation of learning and performance* (pp. 49–64). New York, NY: Routledge/Taylor & Francis Group.

Zimmerman, B. J., & Bonner, S. (1996). A social cognitive view of strategic learning. In C. E. Weinstein & B. L. McComb (Eds.), *Strategic learning: Skill will and self-regulation*. Hillsdale, NJ: Erlbaum.

Zimmerman, B. J., & Martinez-Pons, M. (1986). Development of a structured interview for assessing student use of self-regulated learning strategies. *American Educational Research Journal, 23*(4), 614–628.

Zimmerman, B. J., & Martinez-Pons, M. (1988). Construct validation of a strategy model of student self-regulated learning. *Journal of Educational Psychology, 80*, 284–290.

Zimmerman, B. J., & Kitsantas, A. (2014). Comparing students' self-discipline and self-regulation measures and their prediction of academic achievement. *Contemporary Educational Psychology, 39*(2), 145–155.*

Zimmerman, B. J., & Schunk, D. H. (1989). *Self-regulated learning and academic achievement: Theory, research, and practice*. New York: Springer.

Zuffian, A., Alessandri, G., Gerbino, M., Kanacri, B. P. L., Di Giunta, L., Milioni, M., et al. (2013). Academic achievement: The unique contribution of self-efficacy beliefs in self-regulated learning beyond intelligence, personality traits, and self-esteem. *Learning and Individual Differences, 23*, 158–162.*

Zuffianò, A., Alessandri, G., Gerbino, M., Luengo, K., Bernadette, P., Di Giunta, L., et al. (2013). Academic achievement: The unique contribution of self-efficacy beliefs in self-regulated learning beyond intelligence, personality traits, and self-esteem. *Learning & Individual Differences, 23*, 158–162.*

Zumbrunn, S., Tadlock, J., & Roberts, E. D. (2011). *Encouraging self-regulated learning in the classroom: A review of the literature*. Virginia: Metropolitan Educational Research Consortium.

Chapter 9
The Effect of Locus of Control on Student Achievement

Nazım Çoğaltay

9.1 Introduction

Locus of control is a concept of personality trait that was constructed for the first time by Rotter (1966) in the context of social cognitive theory. This trait refers to the extent to which individuals believe they can control the events affecting them. This concept examines whether individuals have the tendency to believe that their behaviors are based on positive or negative events affecting them or whether they believe that their behaviors are based on external forces such as chance, fate and destiny (Rotter 1966, 1982). Locus of control can be defined as the person's beliefs about what controls his/her behavior or as his/her perceptions about the sources of control in life (Acun 2014; Judge et al. 1998; Strauser et al. 2002).

Regarding who or what affects the results of behavior, Rotter (1966) has discussed the locus of control concept in two dimensions, namely internal control and external control. Internal locus of control reflects the belief that the behaviors of the individuals primarily depend on their personal abilities and traits; in other words, individuals with a strong internal locus of control believe that the results of their actions are derived from their own actions rather than from destiny, chance or others. These individuals believe that they can control the events that affect them. On the other hand, the external locus of control reflects the belief that the behaviors of the individuals occur as a result of the will of a bigger force (chance, fate, destiny) rather than as a result of their own actions; in other words, individuals with a strong external locus of control believe that their behaviors are derived from other forces, such as chance or fate. Individuals with an internal locus of control and the ones with an external locus of control have different perceptions about the source of a reward or achievement that they get, believing that such rewards can be achieved through skill and through chance respectively. For this reason, the different types of

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locus of control affect differently the behaviors of the individuals. Individuals with internal locus of control feel more personal responsibility for their life conditions and results whereas individuals with external locus of control believe that they are controlled by others and by external environmental factors. The relationship between the locus of control, which is considered a personality trait, and organizational and personal variables has been the focus of many studies in the literature (Akça 2013; Ghonsooly and Shirvan 2011; Gootee 2014).

In this study, the effect of the locus of control on student achievement was investigated. In addition, the factors that are thought to affect the average effect size obtained in the study were set as moderators. These are (*i*) the publication year of the research, (*ii*) the publication type of the research, (*iii*) the scale used to measure locus of control, (*iv*) the level of education and (*v*) the culture. All these variables, along with the results of previous research studies, were used to test the following hypotheses of this study:

H_1 Locus of control has a positive effect on student achievement.
H_2 Publication type is a moderator for the positive effect of locus of control on student achievement.
H_3 Sample group is a moderator for the positive effect of locus of control on student achievement.
H_4 School subject or assessment type is a moderator for the positive effect of locus of control on student achievement.
H_5 Tools of data collection is a moderator for the positive effect of locus of control on student achievement.
H_6 The years of the studies is a moderator for the positive effect of locus of control on student achievement.

9.2 Method

9.2.1 Study Design

In this study the effect of locus of control on student achievement was tested with a meta-analysis design.

9.2.2 Review Strategy and Criteria for Inclusion/Exclusion

To determine the research studies to include in the meta-analysis, the Science-Direct, Proquest and Ebsco academic databases were used to conduct a literature review. For this process, the terms *locus of control* and *student achievement/student success* included in the titles of the studies were used to screen

Table 9.1 Characteristics of the studies included in the meta-analysis

Options		1	2	3	Total
Type of publication		Thesis	Article		–
	n	10	10		20[a]
	%	50.0	50.0		100
The years of the studies		2000–2005	2006–2010	2011–2016	
	n	6	3	11	20[a]
	%	30.4	17.4	52.1	100

[a]In three of the research study included in the study, there is a correlation value which belongs to two independent samples so that there is three more data used in the analysis than the independent research studies

the research studies. The end date for the research studies included in the research was identified as January 2016. Doctoral dissertations and peer-reviewed journals were included in the study.

Many strategies were used to identify the research studies that were appropriate for the meta-analysis of the study. First, a research study pool (78 research studies) was established; it included all studies with locus of control and student achievement/success in their titles. The abstracts of these studies were reviewed, and all were found to be appropriate to include in the study. In the second stage, all research studies in the pool were examined in detail. The results of the examination found that 20 of the research studies in the pool were appropriate, and 58 were not found to be suitable. The descriptive statistics of the 20 research studies included in the analysis are presented in Table 9.1.

The criteria for inclusion of the research studies in the analysis study were identified as follows:

- To have the statistical information necessary for correlational meta-analysis (n and r, or R^2 values)
- To be a study measuring the correlation school culture and student achievement/success

Reasons for not including a research study in the meta-analysis:

- Having no quantitative data (qualitative research)
- Not having a correlation coefficient
- Not focusing on student achievement
- Not focusing on locus of control.

9.2.3 Coding Process

The coding process was essentially a data sorting process used to ascertain which data were clear and suitable for the study. In this scope, a coding form was developed before the statistical analysis was conducted, and the coding was conducted according to the form. The main aim was to develop a specific coding system that allowed the study to see the entirety of the research studies in general and that would not miss any characteristics of each individual research study. The coding form developed in the study was comprised of:

- References for the research
- Sample information
- Sample group
- Type of publication,
- School level
- the years of the studies
- Data collection tool(s)
- Quantitative values.

9.2.4 Statistical Processes

The effect size acquired in meta-analysis is a standard measure value used in the determination of the strength and direction of the relationship in the study (Borenstein et al. 2009). Pearson's correlation coefficient (r) was determined to be the effect size in this study. Because the correlation coefficient has a value between $+1$ and -1, the r value calculated was evaluated by converting this value into the value as it appears in the z table (Hedges and Olkin 1985). Provided that more than one correlation value is given between the same structure categories in correlational meta-analysis studies, two different approaches are used in the determination of the one to be used in the meta-analysis (Borenstein et al. 2009; Kulinskaya et al. 2008). For this study, (*i*) first, if the correlations were independent, all the related correlations were included in the analysis and were considered to be independent studies, and (*ii*) if there were dependent correlations, then the *average correlation value* was accepted. Accordingly, for each study, a mean correlation was determined by finding the average of all reported correlations between locus of control and achievement (reading, math, writing, social studies). For example, if one researcher measured math, reading, and writing achievement for third, fourth, and fifth grades, so for each subject area, the average of the three correlations for locus of control and achievement was reported as one correlation. However, in one of the research study included in the study, there is a correlation value which belongs to two independent samples so that there is one more data used in the analysis than the independent research studies. A *random effect model* was used for the meta-analysis processes in this study. The *Comprehensive Meta-Analysis* program was used in the meta-analysis process.

9.2.5 Moderator Variables

To determine the statistical significance of the differences between the moderators of the study, only the Q_b values were used. Five moderator variables that were expected to have a role in the average effect size were identified in the study. The first of these considered is the *type of publication* as a moderator in regards to the relationship between locus of control and student achievement. The second is the *data collection tool which was* thought to have a role on the average impact of locus of control on student achievement. The rest are the *school level, years of the studies*, *culture*.

9.2.6 Publication Bias

A funnel plot for the research studies included in the meta-analysis of can be seen in Fig. 9.1. Evidence that publication bias affected the research studies included in the meta-analysis can be seen in Fig. 9.1. A serious asymmetry would be expected in the funnel plot if there were a publication bias. The concentration of plots on one side under the line of average effect size, particularly in the bottom section of the funnel, suggests the probability of a publication bias in the research studies. In this study, no evidence of partiality of the publications was observed in any of the 23 data subjected to meta-analysis.

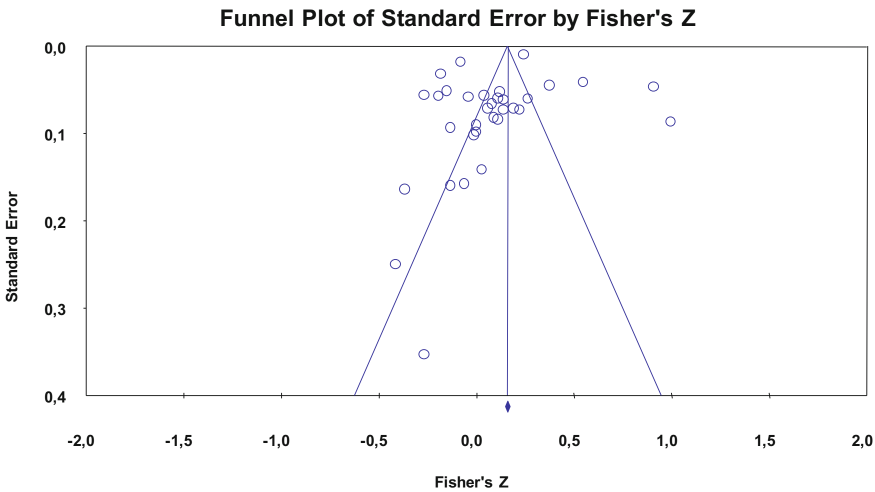

Fig. 9.1 Effect size funnel for publication bias

Table 9.2 Duval and Tweedie's (2000) trim and fill test results

	Excluded studies	Point estimate	*CI* (Confidence interval)		*Q*
			Lower limit	Upper limit	
Observed values		.02	−.11	.12	897.76*
Corrected values	0	.02	−.11	.12	897.76*

*$p < .01$

Although no partiality in publications was observed in the funnel plot, the results of Duval and Tweedie's trim and fill test, which was applied to determine the effect of partiality in publications acquired with the meta-analysis using the random effect model, are given in Table 9.2. As is seen in Table 9.2, there is no difference between the effect observed and the artificial effect size created to fix the effect of the partiality of publications. The research on each side of the center line is symmetrical, and this is the indicator of non-difference. Because there is no evidence indicating lost data on either side of the center line, the difference between the fixed effect size and observed effect size is zero.

9.3 Findings

The results of the meta-analysis about the relationship between locus of control and student achievement are displayed in Table 9.3. The findings did not support hypothesis H1 which formulated that there is a negative relationship between locus of control and student achievement. The effect size of locus of control on student achievement was calculated as 0.02 which showed that locus of control has a low level (*see* Cohen 1988) and statistically insignificant effect on student achievement.

The findings supported hypotheses H_3 and H_6 which stated that the publication type and the culture are moderators in the effect of locus of control on student achievement. The effect size differences of publication type (Q_b = 5,58, $p < .05$) and culture ($Q_b = 13.03$, $p < .01$) were found to be statistically significant. In particular, the effect size of locus of control on student achievement is positive and statistically significant (.15, $p < .05$) for articles while this effect is negative for theses (−.12, $p < .05$). Regarding the culture where the research was carried out, the effect size is statistically significant only in vertical-collectivist cultures (.22, $p < .01$). The findings of this research did not confirm hypotheses H_2, H_4 and H_5 which focused on publication year, the scale used and the level of education. In other words, no moderator effect has been observed in terms of publication year ($Q_b = 3.95$, $p > .05$), the scale used ($Q_b = 4.57$, $p > .05$) and the level of education ($Q_b = 2.38$ $p > .05$).

Table 9.3 Findings of the correlations between locus of control and student achievement: results of meta-analysis

Variables	*k*	*N*	*r*	*CI*		*Q*	Q_b
				Lower limit	Upper limit		
Student Achievement	23	18918	.02	−.11	.12	89,776*	
Moderator [publication type]							**5.58****
Article	10	5260	.15**	−.01	.30		
Dissertation	13	13658	−.12**	−.26	.03		
Moderator [Year of publication]							
2000–2005	7	944	−.20	−.45	−.08		**3.95**
2006–2010	4	4516	−.09	−.40	.24		
2011–2016	12	13458	.13	−.06	.32		
Moderator [Scale]							
Nowicki	3	362	−.26	−.55	.08		**4.57**
Rotter's	15	3497	.07	.06	.21		
Trice's 1985	2	822	.05	.29	.39		
Moderator [Level of education]							
Other	3	14237	−.15	.41	.19		
Elementary	3	362	−.26	−.60	.16		**2.38**
Middle	4	11463	−.05	−.38	.28		
Other	3	645	−.05	−.41	.31		
University	13	6448	.07	.10	.25		
Moderator [Culture]							
Vertical collectivist	7	1989	.22*	−.8	.36		**13.03***
Horizontal Individualistic	16	16929	−.09	−.25	.37		

$*p < .01$, $**p < .05$

9.4 Conclusion

The findings of this meta-analysis study showed that locus of control has a very low and statistically insignificant effect on student achievement. This finding shows that there is no relationship (positive or negative) between locus of control, which reflects students' belief about the control of their behaviors or their perception about the sources of control in life (Judge et al. 1998; Rotter 1966, 1982; Strauser et al. 2002) and which constitutes the basis of many behaviors, and academic achievement. Considering Rotter's (1966) locus of control theory, this finding shows that internal or external locus of control of students does not predict their academic achievement. The increase in the average score taken from the scales used in the studies included in this research represents external control, whereas the decrease represents internal control. This unexpected state of no correlation that we have found in our study let us think that there might be other variables acting as moderators between the locus of control and student achievement or that these two variables are different traits that should not be associated with each other. If the relationship between these two variables is close to zero in subsequent studies including additional variables, then it can be said that these two variables represent different features that should not to be associated with each other. Social cognitive theory assumes that beliefs affect behaviors and the findings of many studies support this argument. The fact, however, that students' behaviors regarding academic achievement are not affected by the locus of control may be due to the multi-dimensional and complex factors that may affect academic achievement. Considering that academic achievement is shaped by many variables, such as teachers, students, parents, environment, school, educational system, genetics and intelligence level, it seems likely that the locus of control belief plays only a minor role.

Regarding the variables of publication year, publication type, scale used, level of education and culture, the results of the analysis showed that only publication year and publication type have a moderator effect in the relationship between locus of control and academic achievement. Considering the type of publication, it can be seen that the effect size differences between the results of papers (articles) and theses are significant. According to the results of the papers, there is a low level positive relationship between locus of control and academic achievement, whereas the results of the theses point towards a low level negative relationship. In other words, the results of the papers show that having external locus increases student achievement slightly, whereas the results of the theses show that having internal locus increases student achievement slightly. This difference between the effect of theses and the effect of articles is striking. This difference also led to a result close to zero for the overall effect size. Since there is no consensus about which results (the ones originating from theses or the ones originating from articles) hold more scientific value, it is decided that taking into account the results as a whole may be more significant.

Concerning the culture where the research was carried out, the finding of the moderator analysis showed that culture plays a role in the relationship between locus of control and student achievement. In horizontal individualistic cultures the effect of locus of control on student achievement is near zero, whereas this effect size is statistically significant in vertical-collectivist cultures. In particular, in vertical-collectivist cultures there is a medium level positive relationship between students' locus of control and their academic achievement, and students' academic achievement increases as their beliefs about external control increase. Vertical-collectivist cultures underline the concepts of "community, nation, state, country, family" rather than emphasizing individual efforts. In these cultures, to explain and understand achievement and failure people may look outside rather than focusing on their own efforts, a phenomenon which is pointed by the findings of our study too. In light of the outcomes of the meta-analysis, the following suggestions are proposed:

- Multiple-correlation studies that include different variables should be performed instead of analyzing the linear relationship of locus of control with student achievement.
- The scale items measuring the locus of control tend to measure the locus of control in general terms. A scale focusing on the identification of the locus of control of students' academic behaviors should be developed and used in the studies, so that its relationship with academic achievement can be retested.
- Similar meta-analysis studies, which will test the relationship of the locus of control with different variables (culture, climate, loyalty, school leadership, etc.) related to school should be conducted.

References

Note. "*" References marked with an asterisk indicate studies included in the meta-analysis. The in-text citations to studies selected for meta-analysis are not followed by asterisks.

Acun, İ. (2014). Web-supported effective human rights, democracy and citizenship education? *Computers & Education, 70,* 21–28.

Adeyinka, T., Adedeji, T., & Olufemi, A. S. (2011). Locus of control, interest in schooling and self-efficacy as predictors of academic achievement among junior secondary school students in Osun state, Nigeria. *New Horizons in Education, 59*(1), 25–37.*

Akça, F. (2013). An investigation into the academic success of prospective teachers in terms of learning strategies, learning styles and the locus of control. *Journal of Education and Learning, 2*(1), 134–146.*

Binder, J. (2014). *Locus of control and academic achievement motivation as predictors of student success in reading developmental education.* Unpublished doctoral dissertation, Walden University, Minnesota.*

Buluş, M. (2011). Goal orientations, locus of control and academic achievement in prospective teachers: An individual differences perspective. *Educational Sciences: Theory & Practice, 11* (2), 540–546.*

Borenstein, M., Hedges, L. V., Higgins, J. P. T., & Rothstein, H. R. (2009). *Introduction to meta-analysis*. Chichester: Wiley.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Hillside, NJ: Lawrence Erlbaum.

Dil, S., & Bulantekin, Ö. (2011). Determination of the relationship between family functionality and locus of control and levels of academic success among nursing students. *Journal of Psychiatric Nursing, 2*(1), 17–24.*

Dinçyürek, S., Güneyli, A., & Çağlar, M. (2011). The relation between assertiveness levels, locus of control and academic success of turkish language teacher candidates. *Sociology Mind, 2*(1), 61–66.*.

Duval, S., & Tweedie, R. (2000). Trim and fill: A simple funnel-plot-based method of testing and adjusting for publication bias in meta-analysis. *Biometrics, 56,* 455–463.

Ghonsooly, B., & Shirvan, M. E. (2011). On the relation of locus of control and l2 reading and writing achievement. *English Language Teaching, 4*(4), 234–244.*

Gifford, D. D., Perriot, J. B., & Mianzo, F. (2006). Locus of control: Academic achievement and retention in a sample of university first-year student. *Journal of college admission, 1*, 18–25.*

Gootee, M. (2014). *Ethnic differences in academic achievement, self-esteem, locus of control, and learning motivation between filipinos and Caucasians.* Unpublished doctoral dissertation, University of the Rockies, Colorado.*

Gujjar, A. A., & Aıjaz, R. (2014). A study to invesıigate the relationship between locus of control and academic achievement of students. I-*Manager's Journal on Educational Psychology, 8*(1), 1–9.*

Hedges, L. V., & Olkin, I. (1985). *Statistical method for meta-analysis*. London: Academic.

Hoover, K. G. (2000). *The relation of locus of control and self-efficacy to academic achievement of college freshmen.* Unpublished doctoral dissertation, School of Saint Louis University, Saint Louis.*

Judge, T. A., Erez, A., & Bono, J. E. (1998). The power of being positive: The relation between positive self-concept and job performance. *Human Performance, 11*(2–3), 167–187.

Kulinskaya, E., Morgenthaler, S., & Staudte, R. G. (2008). *Meta analysis: A guide to calibrating and combining statistical evidence*. Chichester: Wiley.

Ladari, R. B., Sadeghi, M., & Haghshenas, M. (2010). Study of the relationship between locus of control and academic achievement among students of Mazandaran University of Medical Sciences. *Journal of Mazandaran University of Medical Sciences, 20*(77), 30–35.*

Lavender, J.S. (2005). *The relationship between locus of control orientation and academic success in college.* Unpublished doctoral dissertation, Wilmington College, Ohio.*

Miller, J. R. (2007). *Locus of control and academic achievement on high-stakes standardized tests.* Unpublished doctoral dissertation, Walden University, Minnesota.*

Payne, R. H. (2011*). Influence of self-efficacy, locus of control, and computer competency on student success in foundational nursing course.* Unpublished doctoral dissertation, Touro University, California.*

Perkins, M. M. H. (2005). *Locus of control and academic achievement: A comparison of rural European American and African American high school and college students.* Unpublished master dissertation, Southeastern Louisiana University, Louisiana.*

Rotter, J. B. (1966). Generalized expectancies for internal vs. external control of reinforcement. *Psychological Monographs, 80,* 1–28.

Rotter, J. B. (1982). *The development and application of social learning theory: Selected papers*. New York: Praeger.

Russomano, L. (2000). *Achievement, locus of control, self-concept, social problem solving training and the acquisition of prosocial skills in children.* Unpublished doctoral dissertation, Seton Hal University, South Orange.*

Shabazz, K. M. (2007). *The effects of environment and age on locus of control, self efficacy, and self esteem of military and non-military students' academic achievement.* Unpublished doctoral dissertation, Touro University, California.*

Strauser, D. R., Ketz, K., & Keim, J. (2002). The relationship between self-efficacy, locus of control and work personality. *Journal of Rehabilitation, 68,* 20–26.

Suphi, N., & Yaratan, H. (2012). Effects of learning approaches, locus of control, socio-economic status and self-efficacy on academic achievement: A Turkish perspective. *Educational Studies*, *38*(4), 425–437.*

Wood, A. M., Saylor, C., & Cohen, J. (2009). Locus of control and academic success among ethnically diverse baccalaureate nursing students. *Nursing Education Perspectives, 30*(5), 290–294.*

Youse, K. E. (2012). *Locus of control and academic achievement: Integrating social learning theory and expectancy-value theory.* Unpublished doctoral dissertation, Temple University, Philadelphia.*

Chapter 10
The Effect of Socioeconomic Status on Students' Achievement

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10.1 Introduction

The relation between socio-economic status and academic achievement has been examined by many researchers (Bornstein and Bradley 2003; Coleman 1988; Sirin 2005). However, the findings have not been conceptualized in an integrated way, and the findings of meta-analysis research conducted in this particular field reveal some contradictory results. Some researchers argue that there is a strong relationship between socio-economic status and students' achievement showing that low socio-economic status affects students' achievement negatively (Okeye and Okecha 2008; Smedig et al. 2013; Lamndin 1996; Sutton and Soderstrom 1999) whereas other researchers argue that there is no significant correlation at all (Ripple and Luthar 2000; Seyfried 1998). For instance, Tsai and Liu (2013) have shown that the socio-economic status of family plays an important role in students' academic achievement but this impact may slowly decrease when growth is experienced in the learning phase. Similarly, Coleman's (1966) extensive report shows that the relationship between socio-economic status and achievement is unstable. The studies looking into the relationship between socio-economic status and achievement have included a wide array of indicators that may affect achievement. Therefore, this research aims to examine the studies that were published after 2000 taking into consideration the variables mentioned above.

This study looked into the impact of socio-economic status on student achievement. The moderators of the study were as the following: (*i*) the publication year, (*ii*) publication type, (*iii*) the country (culture) in which the research was

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conducted, (*iv*) the course and (*v*) the class/education level. Taking all these variables into consideration this research aimed to test the following hypotheses:

H_1 Socio-economic status has an effect on student achievement.
H_2 Publication year is a moderator for the effect of socioeconomic status on student achievement.
H_3 Publication type is a moderator for the effect of socio-economic status on student achievement.
H_4 The country (culture) in which the study was conducted is a moderator of the effect of socio-economic status on student achievement.
H_5 The course is a moderator for the effect of socioeconomic status on student achievement.
H_6 The level of school in which the study was conducted is a moderator for the effect of socio-economic status on student achievement.

10.2 Method

10.2.1 Study Design

In this study, the effect of socioeconomic status on student achievement was tested with a meta-analysis design.

10.2.2 Review Strategy and Criteria for Inclusion/Exclusion

To determine the research studies to include in the meta-analysis, the Science-Direct, ProQuest and Ebsco academic databases were used to conduct a literature review. For this process, the terms *socio-economic status/socioeconomic status* and *achievement* included in the titles of the studies were used to screen the research studies. The end date for the research studies included in the research was identified as March 2016. Doctoral dissertations and peer-reviewed journals were included in the study.

Many strategies were used to identify the research studies that were appropriate for the meta-analysis of the study. First, a research study pool (187 research studies) was established; it included all studies with socioeconomic status and student achievement/success in their titles. The abstracts of these studies were reviewed, and all were found to be appropriate to include in the study. In the second stage, all research studies in the pool were examined in detail. The results of the examination found that 66 of the research studies in the pool were appropriate, and 121 were not found to be suitable. The descriptive statistics of the 66 research studies included in the analysis are presented in Table 10.1.

Table 10.1 Characteristics of the studies included in the meta-analysis

Variables		1	2	3	Total
Type of publication		Thesis	Article		–
	n	52	14		66
	%	78.79	21.21		100
Publication year of research		2000–2005	2006–2010	2011–2016	
	n	12	20	34	66
	%	18.18	30.30	51.52	100

The criteria for inclusion of the research studies in the analysis study were identified as follows:

- Including *n*, *M*, and *SD* values which make it possible to calculate effect size in independent groups.

Reasons for not including a research study in the meta-analysis:

- Having no quantitative data (qualitative research)
- Not having a *n*, *M*, and *SD*
- Not focusing on student achievement
- Not focusing on socioeconomic status

10.2.3 Coding Process

The coding process was essentially a data sorting process used to ascertain which data were clear and suitable for the study. In this scope, a coding form was developed before the statistical analysis was conducted, and the coding was conducted according to the form. The main aim was to develop a specific coding system that allowed the study to see the entirety of the research studies in general and that would not miss any characteristics of each individual research study. The coding form developed in the study was comprised of:

- References for the research
- Sample information
- The country/culture in which this study was conducted
- Type of publication
- School subject or assessment type
- Tools of data collection, the years of the studies
- Quantitative values.

10.2.4 Statistical Processes

The effect size acquired in meta-analysis is a standard measure value used in the determination of the strength and direction of the relationship in the study (Borenstein et al. 2009). In this study the difference of standardized average (*d*) was determined to be the effect size. This effect size is used to compare the averages of independent groups. There are two models in meta-analysis research: (*i*) fixed effect model and (*ii*) random effect model. To decide which model to use, one should firstly look into the prerequisites that the research included in meta-analysis requires (Borenstein et al. 2009; Littell et al. 2008). The fixed effect model assumes that the research studies examined are functionally identical and it calculates the effect size for an identified population. If the studies examined are not identical in terms of their features and if the aim is to make generalizations from the calculated effect size, then the model that should be used is the random effect model. The fixed effect model estimates only one common effect for each study whereas the random effect model estimates the average of effect distributions in different studies (Hedges and Olkin 1985). A random effect model was used for the meta-analysis conducted in this study. The Comprehensive Meta-Analysis program was used in the meta-analysis process.

10.2.5 Moderator Variables

To determine the statistical significance of the differences between the moderators of the study, only the Q_b values were used. Four moderator variables that were expected to have a role in the average effect size were identified in the study. The first of these considered is the *type of publication* as a moderator in regards to the relationship between socioeconomic status and student achievement. The second is course which was thought to have a role on the average impact of socioeconomic status on student achievement. The rest are the *level of school*, *years of the studies, country/culture*.

10.2.6 Publication Bias

A funnel plot for the research studies included in the meta-analysis of can be seen in Fig. 10.1. Evidence that publication bias affected the research studies included in the meta-analysis can be seen in Fig. 10.1. A serious asymmetry would be expected in the funnel plot if there were a publication bias. The concentration of plots on one

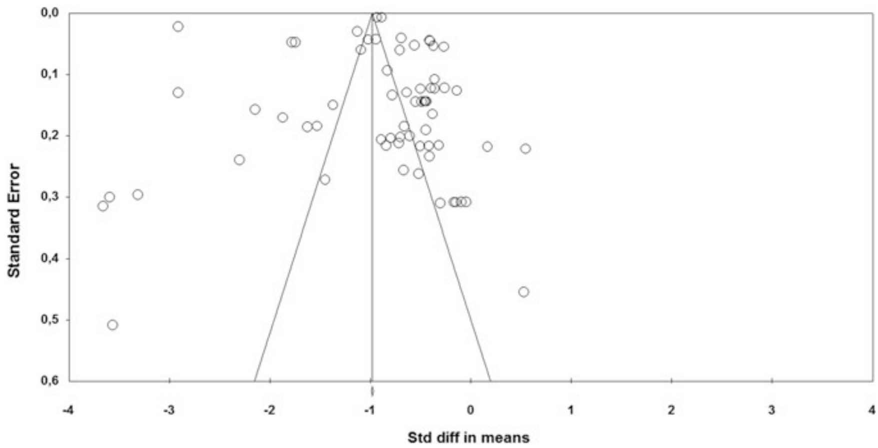

Fig. 10.1 Effect size funnel for publication bias

Table 10.2 Duval and Tweedie's trim and fill test results

	Excluded studies (right of mean)	Point estimate	CI (confidence interval)		Q
			Lower limit	Upper limit	
Observed values		−0.90	−1.03	−0.76	10044.3
Corrected values	0	−0.90	−1.03	−0.76	10044.3

side under the line of average effect size, particularly in the bottom section of the funnel, suggests the probability of a publication bias in the research studies. Evidence for publication bias was observed for the 66 research studies included in the meta-analysis study.

Although no partiality in publications was observed in the funnel plot, the results of Duval and Tweedie's trim and fill test, which was applied to determine the effect of partiality in publications acquired with the meta-analysis using the random effect model, are given in Table 10.2. As is seen in Table 10.2, there is no difference between the effect observed and the artificial effect size created to fix the effect of the partiality of publications. The research on each side of the center line is symmetrical, and this is the indicator of non-difference. Because there is no evidence indicating lost data on either side of the center line, the difference between the fixed effect size and observed effect size is zero.

10.3 Findings

Table 10.3 presents the meta-analysis results regarding the relationship between socio-economic status and student achievement. The findings support hypothesis H_1 which argues that socio-economic status affects student achievement, and the average standardized effect is at a high level ($d = -0.90$). This finding shows that students coming from families which have a higher socio-economic status have higher attainment levels than the students with low socio-economic background.

The moderator analysis confirmed hypothesis H_2 which argues that the publication year has a moderator role in the effect of socio-economic status on student achievement. In particular, the average effect size difference of the various publication years is statistically significant ($Q_b = 13.31$, $p < .01$). According to the analysis results, the highest average effect value is seen in the studies published between 2011 and 2015 and the lowest average effect value is in the studies published between 2006 and 2010.

The hypothesis H_3 which argues that publication type plays a moderator role in the effect of socioeconomic status on student achievement was also supported. The average effect size of the two publication types is statistically significant ($Q_b = 6.58$, $p < .01$), and articles have a higher average effect size compared to theses.

The hypothesis H_4 which argues that the country/culture in which the research was conducted has a moderator role in the effect of socioeconomic status on achievement was disconfirmed. There was no statistically significant difference in the average effect size ($Q_b = 0.14$, $p > 0.05$), and vertical-collectivist cultures have similar average effect values with horizontal-individualist cultures.

The fifth hypothesis (H_5) which argues that the course has a moderator role in the effect of socioeconomic status on student achievement was confirmed. The average effect size difference was statistically significant ($Q_b = 53.62$, $p < .01$), and the highest average effect value was observed in the studies where GPA was measured while the lowest average effect size was seen in the research which measured achievement in computer courses.

Finally, the hypothesis H_6 which argues that the level of school in which the research was conducted has a moderator role in the effect of socioeconomic status on student achievement was confirmed and the average effect size difference is statistically significant ($Q_b = 273.90$, $p < .01$). The highest average effect size is in the studies conducted at universities while the lower average effect size is in the research conducted in high schools.

Table 10.3 The effect of socioeconomic status on student achievement: meta-analysis findings

Variable		k	N_{LowSES}	$N_{HighSES}$	D	CI (confidence interval)	Q	Q_b
						Lower limit	Upper limit	
SES	66	107,502	159,315	−0.90	−1.03	−0.76	10044.3*	
Moderator [publication year]								13.31*
2000–2005		12	4,991	11,224	−0.82*	−0.98	−0.66	
2006–2010		20	2,547	1,745	−0.57*	−0.81	−0.34	
2011–2016		34	99,964	146,346	−1.14*	−1.34	−0.94	
Moderator [publication type]								6.58*
Article		14	16,081	6,154	−1.30*	−1.65	−0.94	
Thesis		52	91,421	153,161	−0.79*	−0.95	−0.64	
Moderator [country/culture]								0.14
Vertical-collective		7	11,990	1,953	−0.84*	−1.11	−0.57	
Horizontal-individualist		59	95,512	157,362	−0.90*	−1.04	−0.75	
Moderator [course]								53.62*
Computer		2	927	2,554	−0.31*	−0.42	−0.21	
GPA		9	5,384	5,648	−1.19*	−1.55	−0.83	
Language		12	19,125	9,513	−0.90*	−1.74	−0.05	
Mathematics		21	40,396	73,189	−0.89*	−1.09	−0.69	
Reading		14	39,865	66,641	−0.84*	−1.04	−0.64	
Science		5	1,537	1,561	−0.79*	−1.52	−0.05	
Social sciences		3	268	209	−0.39*	−0.66	−0.13	
Moderator [level of school]								273.90*
Elementary school		34	88,493	141,150	−0.69*	−0.76	−0.62	
High school		6	199	208	−0.45*	−1.22	0.31	
Secondary school		25	18,567	17,714	−1.21*	−1.65	−0.77	
University		1	243	243	−2.91*	−3.16	−2.65	

*$p < .01$

10.4 Conclusion

The impact of socio-economic status (SES) on achievement has been investigated by many researchers. Research on different communities and backgrounds has examined the relationship between SES and student achievement from different perspectives and it has thus helped to analyze education systems from a social justice perspective. Within this context, this meta-analysis research analyzed studies conducted between 2000 and 2016 in different countries and it looked at how SES affects achievement and how this effect changes when different moderator variables are included.

According to the findings, regardless of how it is defined, SES affects students' academic achievement and this finding supports the previous review studies (Coleman 1988; Reynolds and Walberg 1992; Sirin 2005). In particular, previous studies have shown that students' academic achievement is affected by variables such as additional educational and family resources, teachers' experiences, location and family participation. This proves that the developed school policies and reforms do not provide equal opportunities for students from low SES.

This meta-analysis research has looked into the relationship between SES and academic achievement and examined the moderator variables of publication year and type, country/culture, course and level of school. The analysis showed that SES had a higher effect on achievement in studies conducted between 2010 and 2016 whereas it could be argued that SES had a lower effect on achievement in studies conducted between 2005 and 2010. In addition, the relationship between SES and achievement is stronger in journal articles compared to dissertations.

An interesting finding of the study is that SES has an important effect on achievement both in vertical-collectivist and in horizontal-individualist cultures. This finding points out that the countries included in this research face some problems regarding the issues of equal opportunities in education and school effectiveness. On the other hand, Yang (2003) used TIMSS (Trends in International Mathematics and Science Study) data drawn from 17 countries and regions (Canada, Denmark, Germany, Greece, Hong Kong, Hungary, Iceland, Ireland, Netherlands, New Zealand, Norway, Portugal, Singapore, Slovenia, Sweden, Switzerland and the USA) and he found out that culture is an important moderator variable.

When the findings are analyzed in terms of course variable, SES greatly affects GPA while computer courses are the least affected by SES (0.31). The courses of language (1.19), mathematics (0.90), reading (0.89) and science (0.84) are almost similar affected by SES. Likewise, the research of Ma (2008) on PISA and TIMMS found out that science, maths and reading courses are all similarly affected by SES.

Lastly, when the level of school is analyzed as a moderator variable, SES is found to have an effect on academic achievement at all levels of school. Although this effect is lower in high schools (0.45), there is a gradual increase of the effect of SES on academic achievement in all the other school levels. Especially at university level, this effect shows a considerable increase (2.91). With regard to this finding, previous research shows us contradictory results. For instance, White (1982) argues that as the class level increases, the correlation between SES and school achievement decreases. This is explained with the fact that schools provide more equal opportunities over time or that students drop out.

References

Note. "*" References marked with an asterisk indicate studies included in the meta-analysis. The in-text citations to studies selected for meta-analysis are not followed by asterisks.

Alldred, C. C. (2013). *A study of eighth grade students 'self-efficacy as it relates to achievement, gender, and socioeconomic status.* Unpublished doctoral dissertation, Liberty University.*

Alordiah, C. O., Akpadaka, G., & Oviogbodu, C. O. (2015). The influence of gender, school location and socio-economic status on students' academic achievement in mathematics. *Journal of Education and Practice*, *6*(17), 130–136.*

Barrett, J. A. (2013). *Elementary school computer access, socioeconomic status, ethnicity, and grade 5 student achievement*. Unpublished dissertation, Sam Houston State University.*

Barry, J. (2006). *The effect of socio-economic status on academic achievement.* Unpublished doctoral dissertation, Wichita State University.*

Bentzel, E. J. (2012). *The combined effects of low socioeconomic status and high mobility on elementary achievement scores in Pennsylvania.* Unpublished doctoral dissertation, Capella University.*

Berger, N., & Archer, J. (2016). School socio-economic status and student socio-academic achievement goals in upper secondary contexts. *Social Psychology of Education*, *19*(1), 175–194.*

Borenstein, M., Hedges, L. V., Higgins, J. P. T., & Rothstein, H. R. (2009). *Introduction to meta-analysis*. UK: Wiley.

Bornstein, M. C., & Bradley, R. H. (Eds.). (2003). *Socioeconmic status, parenting, and child development*. Mahwah, NJ: Lawrence Erlbaum.

Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology, 94,* 95–120.

Coleman, J. S., Campbell, E. Q., Hobson, C. J., McPartland, J., Mood, A. M., Weinfeld, F. D., et al. (1966). *Equality of educational opportunity*. Washington, DC: Government Printing Office.

Cueto, S., Guerrero, G., Leon, J., Zapata, M., & Freire, S. (2014). The relationship between socioeconomic status at age one, opportunities to learn and achievement in mathematics in fourth grade in Peru. *Oxford Review of Education*, *40*(1), 50–72.*

Dawson, G. L. (2014). *Impact of preschool education on the academic achievement of low socio-economic status elementary students.* Unpublished doctoral dissertation, Duquesne University.*

Dotson, L. (2014). *Middle grade academic achievement and socioeconomic status on North Carolina State*. Unpublished dissertation, North Carolina State University.*

Eni-Olorunda, T., & Adediran, O. A. (2013). Socio-economic status difference in English language comprehension achievement of pupils with intellectual disability. *Ife Psychologia*, *21*(2), 242.*

Fergusson, D. M., Horwood, L. J., & Boden, J. M. (2008). The transmission of social inequality: Examination of the linkages between family socioeconomic status in childhood and educational achievement in young adulthood. *Research in Social Stratification and Mobility*, *26*(3), 277–295.*

Feyerherm, J. L. (2008). *The relationship between socioeconomic status and reading achievement in English language learners: Dual language vs. English only programs*. Unpublished doctoral dissertation, University of Nebraska.*

Hedges, L. V., & Olkin, I. (1985). *Statistical method for meta-analysis*. United Kingdom: Academic Press.

Hsieh, K. J. (2002). *Differences among high school students' mathematics achievement based on school location, school socioeconomic status, and student ethnicity*. Unpublished doctoral dissertation, University of Houston.*

Huang, H. (2015). Can students themselves narrow the socioeconomic-status-based achievement gap through their own persistence and learning time? *Education Policy Analysis Archives*, *23* (108), n108.*

Jimenez, G. M. (2001). *The relationship between socioeconomic status and student achievement of middle school children*. Unpublished dissertation, California State University.*

Kurian, N. (2012). Impact of resilience and role model influence on academic achievement of low socio-economic status adolescent students. *Indian Journal of Positive Psychology*, *3*(3), 250–254.*

Lamdin, D. J. (1996). Evidence of student attendance as an independent variable in education production functions. *Journal of Educational Research, 89*(3), 155–162.

Littell, J. H., Corcoran, J., & Pillai, V. (2008). *Systematic reviews and meta-analysis*. New York: Oxford University.

Ma, X. (2008). *A global perspective on socioeconomic differences in learning outcomes*. UNESCO: Education for All Global Monitoring Report.

Maxwell, A. F. (2007). *A comparison of the academic achievements of intermediate students based on socioeconomic status and participation in an after-school program*. Unpublished doctoral dissertation, East Tennessee State University.*

McConney, A., & Perry, L. B. (2010). Socioeconomic status, self-efficacy, and mathematics achievement in Australia: A secondary analysis. *Educational Research for Policy and Practice*, *9*(2), 77–91.*

McCorvey-Watson, C. (2012). *Socioeconomic status and academic achievement of elementary students in Mississippi*. Unpublished doctoral dissertation, Walded University.*

McCullough, M. T. (2011). *Impact of national board certification, advanced degree, and socio-economic status on the literacy achievement rate of 11th grade students in Arkansas*. Unpublished doctoral dissertation, Arkansas State University.*

Mosley, M. L. (2006). *The relationship of gender, socioeconomic status, and attendance on mathematics achievement of seventh grade students*. Unpublished doctoral dissertation, University of Alabama.*

Norris, T. A. (2000). *A longitudinal study of predictors of student achievement related to socioeconomic status, race/ethnicity, attendance, and student mobility*. Unpublished doctoral dissertation, University of Nebraska.*

O'Rourke, P. W. (2006). *Effects of rural high school size and socioeconomic status on achievement of tenth graders*. Unpublished doctoral dissertation, Indiana State University.*

Okoye, N. S., & Okecha, R. E. (2008). The interaction of logical reasoning ability and socio-economic status on achievement in genetics among secondary school students in Nigeria. *College Student Journal*, *42*(2), 617–624.*

Özdemir, N., Ayral, M., Fındık, L. Y., Ünlü, A., Özarslan, H., & Bozkurt, E. (2014). The relationship between students' socioeconomic status and their Turkish achievements. *Procedia-Social and Behavioral Sciences*, *143*, 726–731.*

Pettigrew, E. J. (2009). A *study of the impact of socioeconomic status on student achievement in a rural east Tennessee school system*. Unpublished doctoral dissertation, East Tennessee State University.*

Reynolds, A. J., & Walberg, H. J. (1992). A process model of mathematics achievement and attitude. *Journal for Research in Mathematics Education*, *23*(4), 306–328.

Ripple, C. H., & Luthar, S. S. (2000). Academic risk among inner-city adolescents: The role of personal attributes. *Journal of School Psychology, 38*(3), 277–298.

Seyfried, S. F. (1998). Academic achievement of African American preadolescents: The influence of teacher perceptions. *American Journal of Community Psychology, 26*(3), 381–402.

Sirin, S. R. (2005). Socioeconomic status and academic achievement: A meta-analytic review of research. *Review of Educational Research, 75*(3), 417–453.

Smeding, A., Darnon, C., Souchal, C., Toczek-Capelle, M. C., & Butera, F. (2013). Reducing the socio-economic status achievement gap at university by promoting mastery-oriented assessment. *PLoS ONE, 8*(8), e71678.

Soden-Hensler, B. (2012). *An examination of gene x socioeconomic status interactions for reading achievement*. Unpublished doctoral dissertation, Florida State Unsiversity.*

Sutton, A., & Soderstrom, I. (1999). Predicting elementary and secondary school achievement with school-related and demographic factors. *Journal of Educational Research, 92*(6), 330–338.

Tok, B. R., & Dupak, S. (2015). A study on academic achievement in relation with socio economic status of secondary school students with reference to east Siang district of Arunachala Pradesh. *International Journal of Multidisciplinary Approach and Studies*, *2*(5), 37–44.*

Trent, S. E. (2007). *A descriptive study of the effect of traditional and year-round calendars, socio-economic status, and teacher tenure status on student achievement in two rural school systems in Tennessee.* Unpublished doctoral dissertation, Liberty University.*

Tsai, M., & Liu, F. (2013). Multigroup structural equation approach: Examing the relationship among family socioeconomic status, parent-child interaction, and academic achievement using TASA samples. *International Journal of Intelligent Technologies & Applied Statistics*, *6*(4), 353–373. doi:10.6148/IJITAS.2013.0604.03.

Utne, J. S. (2001). *A relationship between student socioeconomic status, perceptions of school environment, academic achievement, and school attendance*. Unpublished doctoral dissertation, University of Missouri-Columbia.*

Weers, A. J. (2012). *The impact of socioeconomic status on achievement of high school students participating in a one-to-one laptop computer program*. Unpublished doctoral dissertation, University of Nebraska.*

White, K. R. (1982). The relation between socioeconomic status and academic achievement. *Psychological Bulletin, 91*(3), 461–481.

Yang, Y. (2003). Dimensions of socio-economic status and their relationship to mathematics and science achievement at individual and collective levels. *Scandinavian Journal of Educational Research, 47*(1), 21–41.

Chapter 11
The Effect of School Culture on Student Achievement

Mehmet Koçyiğit

11.1 Culture and Organizational Culture

When the concept of culture is mentioned, various fields ranging from anthropology to education come to mind. Its use in the field of organization theory is relatively new but it has provided opportunities for the development of new concepts. Although it is an abstract and comprehensive concept, some social and organizational situations can be said to have been derived from culture itself. It is an important concept to know because if one understands the organizational culture then he/she will better understand both the group or the organization and himself/herself (Schein 2010). According to Karadağ et al. (2014, p. 105), culture is a significant concept for organizations as it influences them in terms of balance, loyalty, unity and ability. Various definitions of this abstract and comprehensive concept can be found in the related literature. Bates (1987, p. 108) defines culture as follows:

> It is culture that gives meaning to life. The beliefs, languages, rituals, knowledge, conventions, courtesies and artefacts, in short the cultural baggage of any group are the resources from which individual and social identity are constructed. They provide the framework upon which the individual constructs his understanding of the world and of himself. Part of this baggage is factual. It is empirical, descriptive, and objective. Another part of this cultural baggage, perhaps the greater part, is mythical. It is concerned not with facts but with meaning: that is, with the interpretive and prescriptive rules which provide the basis for understanding and action (Bates 1981, p. 37, cited in Bates 1987, p. 108).

According to this definition it will not be wrong to picture culture like an intersection set which combines facts and myths and forms a basis and a pattern for the construction of individual and social identity. These two forms of identity take shape from this pattern and rise on this basis. It is like a lens through which an

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individual or a group sees life and construes it. Schein (2010, p. 18) defines the culture of an organization as below:

"The culture of a group can now be defined as a pattern of shared basic assumptions learned by a group as it solved its problems of external adaptation and internal integration, which has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems." From this definition it could be inferred that he mostly sees culture as a kind of total organizational experience and considers it vital for the organization as it is the registry of the organizational history or the record of the immune system of the organization. Therefore, organizational culture needs to be taught and transferred to new members so that they could better face the problems that are likely to occur in the future. In his book Schein (2010) also indicates that a group's culture could be studied at three levels which are the level of the group's artefacts, the level of its espoused beliefs and values and the level of its basic underlying assumptions.

The studies about the impact of culture on organizations and organizational performance are not new, given that they have been conducted since the 1940s (regarding school culture, Waller's The Sociology of Teaching (1932) is noteworthy) (Deal and Peterson 2009; Maslowski 2006). The interest for the concept, however, has grown in the late 1970s with the rise of Japanese companies and the decline of the American and European ones (Alvesson 2002, 1990; Koçyiğit 2015; Maslowski 2006; Ogbonna and Harris 2002a).

Despite the fact that there are many studies on the concept of organizational culture, a common definition and a common scope about this concept cannot be found in the related literature. There are many definitions, typologies and perspectives on the concept that are suggested by researchers, and, indeed, this has increased the confusion about the concept of organizational culture (Harris and Ogbonna 1998; Koçyiğit 2015; Ogbonna and Harris 2002b). At the same time, however, culture is an important concept which helps us to better understand organizations. Despite the differences in the literature, it can be understood from the related studies that any organizational culture consists of long-standing traditions, a special language, a mind-set that helps members' interpretation of reality, shared standards and norms, values, beliefs, assumptions and prejudices, ideologies, models for social manners and behaviour, certain customs and rituals suggestive of how members are to relate to colleagues, subordinates, superiors and outsiders and the organization's "common sense" regarding the appropriate behaviour, actions and practices of an organization (Alvesson 1990; Gruenert 1998; Koçyiğit 2015; Sarros et al. 2011).

11.1.1 School Culture

School culture is one of the most appealing areas in educational research, and the idea of schools having distinctive cultures is not new. Its roots can be traced back to Waller's "The Sociology of Teaching" in 1932. Willard Waller indicated that schools have a culture that is definitely their own, and schools have rituals, a set of folkways, mores, irrational sanctions, a moral code, games, teams and ceremonies (Deal and Peterson 2009; Maslowski 2006).

Deal and Peterson (2009, p. 6) notes that for schools “the term *culture* provides a more accurate and intuitively appealing way to help school leaders better understand their school’s unwritten rules and traditions, norms, and expectations. The unofficial pattern seems to permeate everything: the way people act, how they dress, what they talk about or consider taboo, whether they seek out colleagues or isolate themselves, and how teachers feel about their work and their students”. It can be seen that it takes time for a school to develop its own distinctive culture; in other words, the school should have a ‘history’ first, since this kind of symbolic entities do not develop overnight. School cultures are complex webs of traditions and rituals which are established over time (Deal and Peterson, 2009, p. 6). According to Gruenert (1998), through the interconnectedness of these symbols, rituals, ceremonies, heroes, myths, stories, values and norms schools represent what they value. Every school has a culture and some are stronger than others, but this does not mean that the strongest culture provides the best conditions for education. Yet, culture affects all aspects of a school. Culture promotes school effectiveness and productivity, improves collegiality, collaboration, communication and problem-solving practices, promotes innovation and school improvement, builds commitment and kindles motivation, amplifies the energy and vitality of school staff, students and community and draws attention to what is valued and seen as important (Deal and Peterson 2009).

Gruenert (1998) concretizes the elements of school culture comprehensibly in his study. In a school, “symbols” of the culture may include trophies, banners, dresses and the stories shared by its members. “Rituals” could include the daily taking of attendance, and “examples” would be the annual graduation ceremony or a retirement party. “Myths” help teachers maintain shared attitudes toward various aspects of the school, and “stories and fairy tales” help to address problems related to morale, security, socialization and communication. School “values” are the basic beliefs that control how an institution operates, and they are the criteria through which one can judge the appropriateness of individual and group behaviour. “Norms” are manifestations of members’ values (Gruenert 1998, pp. 20–24).

A school does not necessarily have to be influenced by a positive school culture. Schools can have negative, toxic cultures too. These toxic cultures “perpetuate the downbeat, pessimistic status quo” (Deal and Peterson 2009, p. 173).

11.1.2 School Culture and Student Achievement

According to Alvesson, although “it is not possible to say that corporate culture—in general or a specific type of culture—has a clear and simple effect on performance this does not mean that there is no connection between culture (however defined) and performance; on a general level there certainly is” (Alvesson 2002, p. 68).

There are studies in the literature indicating that cultural patterns have a powerful impact on performance and they affect school outcomes and student achievement or at least they are correlated (Brown 2005; Cunningham 2003; Deal and Peterson 2009; Fraley 2007; Gruenert 2005; Karadağ et al. 2014; Swindler 2009).

This study examined the effect of school culture on student achievement. The moderators (which are hypothesized to affect the average level of impact) were identified as follows: (*i*) type of publication, (*ii*) sample group, (*iii*) school subject or assessment type, (*iv*) the tool of data collection, (*v*) the year of the studies, (*vi*) the country that the research took place and (*vii)* sub-dimension of school culture. All these variables were used to test the following hypotheses:

H_1 School culture has a positive effect on student achievement.
H_2 The type of publication is a moderator for the positive effect of school culture on student achievement.
H_3 The sample group is a moderator for the positive effect of school culture on student achievement.
H_4 School subject or assessment type is a moderator for the positive effect of school culture on student achievement.
H_5 The tool of data collection is a moderator for the positive effect of school culture on student achievement.
H_6 The year of the studies is a moderator for the positive effect of school culture on student achievement.
H_7 The country that the research took place is a moderator for the positive effect of school culture on student achievement.
H_8 Sub-dimensions of school culture is a moderator for the positive effect of school culture on student achievement.

11.2 Method

11.2.1 Study Design

In this study, the effect of school culture on student achievement was tested using the meta-analysis design.

11.2.2 Review Strategy and Criteria for Inclusion/Exclusion

To determine the studies to include in the meta-analysis, the Science-Direct, Proquest and Ebsco databases were used. For this process, the terms "*school culture*" and "*student achievement/student success*" were searched in the titles to identify the studies. The date of the search on the databases was 9 February 2016.

Table 11.1 Characteristics of the studies included in the meta-analysis

Options		1	2	3	4	5	6	Total
Type of publication		Thesis	Article					–
	n	44	7					51
	%	86.3	13.7					100
Sample group/unit		3–12th grade students	Instructional staff	Principals	Schools	Teachers	Teachers and administrators	
	n	8	1	6	4	26	6	51
	%	15.7	1.96	11.8	7.8	51	11.8	100

Doctoral dissertations and peer-reviewed academic journals were included in the study.

Many strategies were used to identify the studies that were appropriate for the meta-analysis. Firstly, a pool (303 studies) was formed of all studies with school culture and student achievement/success in their titles. The abstracts of these studies were examined and 71 were found appropriate to include in the study. In the second phase, all studies in the pool were examined in detail. The result of the examination showed that 51 of the studies in the pool were appropriate and 20 were not. The descriptive statistics of the 51 studies included in the analysis are presented in Table 11.1.

The criteria for inclusion of the studies into the analysis were identified as following:

- To have the statistical information necessary for correlational meta-analysis (n and r, or R^2 values),
- To be a study measuring the correlation between school culture and student achievement.

Reasons for not including a study in the meta-analysis:

- Having no quantitative data (qualitative study),
- Not having a correlation coefficient,
- Not focusing on school culture,
- Not focusing on student achievement.

11.2.3 Coding Process

The coding process is essentially a data sorting process, which is used to obtain convenient data suitable for the study out of complex information. In this scope, a coding form was developed before the statistical analysis and the coding was carried out according to the form. The purpose was to develop a specific coding system which allowed the researcher to see the studies as a whole in general and also he would not miss any characteristics of each individual study. The coding form developed in the study comprised of:

- Reference of the study
- Type of study
- Sample group
- School subject/assessment type
- Data collection tool(s)
- Year
- Country
- Sub-dimensions of school culture
- Quantitative values (n and r, or R^2).

11.2.4 Statistical Processes

The effect size acquired in meta-analysis is a standard measure value used in the determination of the strength and direction of the relationship in the study (Borenstein et al. 2009). Pearson's correlation coefficient (r) was determined to be the effect size in this study. Because the correlation coefficient has a value between $+1$ and -1, the r value calculated was evaluated by converting this value into the value as it appears in the z table (Hedges and Olkin 1985). Provided that more than one correlation value is given between the same structure categories in correlational meta-analysis studies, two different approaches are used in the determination of the one to be used in the meta-analysis (Borenstein et al. 2009; Kulinskaya et al. 2008). For this study, (*i*) first, if the correlations were independent, all the related correlations were included in the analysis and were considered to be independent studies, and (*ii*) if there were dependent correlations, then the *highest correlation value* was accepted. A *random effect model* was used for the meta-analysis processes in this study. The *Comprehensive Meta-Analysis* program was used in the meta-analysis process.

11.2.5 Moderator Variables

To determine the statistical significance between the moderators of the study, only the Q_b values were used. Eight moderator variables which were thought to have a role on average impact size were identified in the study. The first of these considered is the *type of publication* as a moderator in regards to the relationship between school culture and student achievement. The second is the *sample group* which was thought to have a role on the average impact of school culture on student achievement. The rest are the *school subject/assessment type, data collection tools*, *years of the studies*, *country*, and *sub-dimensions of school culture*.

11.2.6 Publication Bias

A funnel plot to present the evidence of an effect due to possible publication bias for the studies included in the meta-analysis can be seen in Fig. 11.1. A significant asymmetry would be expected in the funnel plot if there is a publication bias. The concentration of plots for the studies compiling on one side under the line of average impact size, especially at the bottom section of the funnel, suggests the probability of a publication bias. In this study, although the plots for the studies seem to concentrate on one side of the funnel, no evidence of publication bias was observed for the studies subjected to meta-analysis as the plots being not near to the bottom.

As the plots for the studies seem to concentrate on one side of the funnel in the funnel plot, the results of Duval and Tweedie's trim and fill test, which is applied to determine the impact quantity related to partiality in publications, acquired with the meta-analysis using the random effect model, is also given in Table 11.2 As it can be seen in Table 11.2, there is no difference between the observed impact and

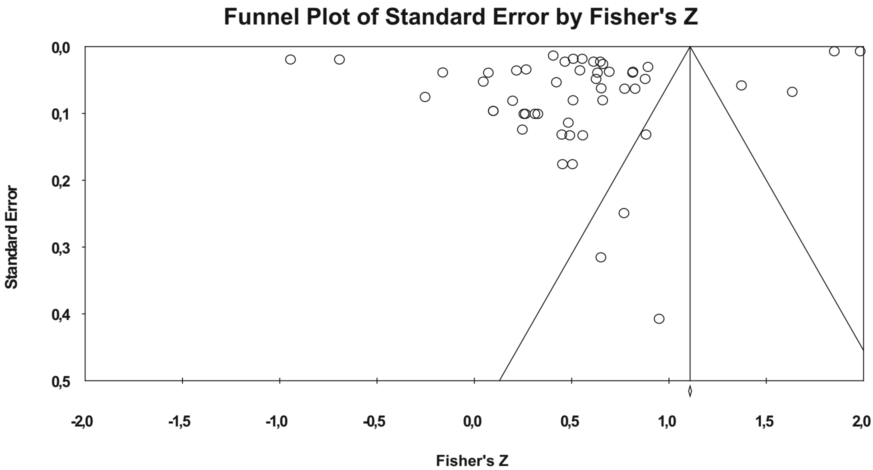

Fig. 11.1 Impact size funnel for publication bias

Table 11.2 Duval Tweedie Trim-Fill test results

	Excluded studies	Point estimate	CI (Confidence Interval)		Q
			Lower limit	Upper limit	
Observed values		0,80	0,26	0,66	51215,9749
Corrected values	0	0,80	0,26	0,66	51215,9749

artificial impact quantity created to fix the impact resulting from the publication bias as the difference between the fixed impact quantity and observed impact quantity is zero. It can be concluded that there is no evidence of publication bias for this study.

11.3 Findings

Table 11.3 shows the results of meta-analysis which investigated the relationship between school culture and student achievement. The findings supported hypothesis H_1 which argues that there is a positive relationship between school culture and student achievement. The impact value of school culture on student achievement was calculated to be 0.49 ($p < .01$). This result shows that school culture has a medium level effect (*see* Cohen 1988) on student achievement.

The results of the moderator analysis showed that hypothesis H_2 regarding the effect of the type of publication on the level of impact of school culture on student achievement was rejected. According to the results of the moderator analysis, the impact level differences between the publication types were found to be statistically insignificant. ($Q_b = 0.03$, $p > .05$). Despite this finding, the effect was of a medium level for both theses [$r = .48$, $p < .01$] and articles [$r = .53$].

The findings did not provide support for hypothesis H_3 which stated that the sample group plays a moderator role on the effect of school culture on student achievement. Although there was no statistically significant difference between the level of the effect of sample group ($Q_b = 1.37$, $p > .05$), a medium level impact of sample group on student achievement was found for 3–12th grade students [$r = .65$, $p < .01$], instructional staff [$r = .40$], principals [$r = .35$], schools [$r = .52$], teachers [$r = .45$, $p < .01$] and teachers and administrators [$r = .48$].

Findings rejected the hypothesis H_4 which formulated that school subject or assessment type is a moderator for the positive effect of school culture on student achievement. The moderator analysis did not find a statistically significant difference between the level of impact of subject/assessment ($Q_b = 7.01$, $p > .05$). Although statistically insignificant, the impact levels of the variables were found as following: C.A.T [$r = .50$], Communication Arts [$r = .48$], FCAT [$r = .09$], G.P.A [$r = -.16$], 9–10th grade annual results [$r = .08$], HKCEE best 6 subjects [$r = .18$], Language Arts [$r = .05$], Maths [$r = .54$, $p < .05$], Mississippi QDI [$r = .93$], Ohio 6th Grade P.T. [$r = .22$], Reading [$r = .62$, $p < .01$], Reading and ELA [$r = .42$], SBS [$r = .88$], Science [$r = .42$], SIVS [$r = .74$], Social Studies [$r = .32$], SPS [$r = .05$], TES [$r = .39$], TIMSS [$r = .71$] and Writing [$r = .61$].

The findings supported hypothesis H_5, which stated that the tools of data collection is a moderator for the positive effect of school culture on student achievement. The moderator analysis found a statistically significant difference between the impact values of data collection tools regarding student achievement ($Q_b = 374.86$, $p < .01$). The impact levels of the variables were found as following: Cunningham's (2003) SCS [$r = .40$, $p < .05$], ELS:2002 [$r = .96$, $p < .01$], Gay (2002) [$r = .075$], OCQ Feitler and Gudgel (1994) [$r = .22$], Own [$r = .35$, $p < .01$],

Table 11.3 Findings of the correlations between school culture and student achievement: results of meta-analysis

Variable	k	N	*R*	CI (confidence interval)		Q	Q_b
				Lower limit	Upper limit		
School culture	51	66391	.49**	.26	.66	51215,98*	
Moderator [type of publication]							**0.03**
Thesis	44	53178	.48**	.24	.66		
Article	7	13213	.53	−.10	.85		
Moderator [Sample group]							**1.37**
3–12th grade students	8	44665	.65**	.27	.86		
Instructional staff	1	343	.40	−.77	.95		
Principals	6	518	.35	−.22	.75		
Schools	4	158	.52	−.17	.87		
Teachers	26	14161	.45**	.20	.65		
Teachers and administrators	6	6546	.48	−.07	.80		
Moderator [subject-assessment]							**7.01**
C.A.T	1	760	.50	−.83	.98		
Communication arts	3	856	.48	−.45	.91		
FCAT	2	518	.09	−.81	.87		
G.P.A	1	644	−.16	−.96	.92		
9–10th grade annual results	1	630	.08	−.93	.95		
HKCEE best 6 subjects	1	152	.20	−.91	.96		
Language arts	5	8090	.05	−.62	.68		
Maths	13	23935	.54*	.12	.80		
Mississippi QDI	1	216	.93	−.10	.10		
Ohio 6th grade P.T.	1	749	.22	−.91	.96		
Reading	11	21089	.62**	.20	.85		
Reading and ELA	1	60	.42	−.86	.98		
SBS	1	291	.88	−.35	.10		
Science	2	113	.42	−.68	.94		
SIVS	1	9	.74	−.74	.99		
Social studies	1	100	.32	−.89	.97		
SPS	1	356	.05	−.93	.95		
TES	1	4949	.39	−.87	.97		
TIMSS	1	1026	.71	−.68	.99		
Writing	2	1848	.61	−.49	.96		
Moderator [data collection tool]						**374.86****	
Cunningham's (2003) SCS	1	343	.40*	.09	.64		
ELS:2002	2	32394	.96**	.94	.97		
Gay (2002)	1	630	.08	−.24	.38		
	1	749	.21	−.10	.49		

(continued)

Table 11.3 (continued)

Variable	k	N	*R*	CI (confidence interval)		Q	Q_b
				Lower limit	Upper limit		
OCQ Feitler and Gudgel (1994)							
Own	9	7535	.35**	.24	.46		
RSCEQ Olivier (2001)	1	356	.05	−.27	.36		
School analysis model 2000 (SAM)	2	4890	−.67**	−.78	−.53		
School work culture profile (SWCP) Snyder (1988)	2	310	.53**	.33	.68		
SCS	25	16023	.57**	.52	.61		
SCTS Phillips (1996)	3	1256	.61**	.48	.72		
SCTS Wagner (2006)	1	60	.71**	.45	.86		
SIQ-II (Webb and Pajares 1996)	1	175	−.25	−.54	.10		
SISI standard four school culture	1	644	−.16	−.45	.16		
TIMSS background	1	1026	.71**	.52	.84		
Moderator [years]	**k**	**N**	***R***	**Lower limit**	**Upper limit**	**18.72***	
1996–2000	5	5349	.31	−.12	.64		
2001–2005	14	19780	.23	−.02	.46		
2006–2010	23	7247	.48**	.31	.62		
2011–2015	9	34015	.81**	.67	.90		
Moderator [country]	**k**	**N**	***R***	**Lower Limit**	**Upper Limit**	**1.29**	
Australia	1	4949	.39	−.91	.98		
Belgium	1	817	.26	−.93	.98		
Cyprus	1	1026	.71	−.77	.99		
Hong Kong	1	152	.20	−.94	.97		
Pakistan	1	630	.08	−.95	.96		
The USA	45	58526	.49**	.24	.67		
Turkey	1	291	.89	−.50	.10		
Moderator [school culture sub-dimension]	**k**	**N**	***R***	**Lower limit**	**Upper limit**	**1.94**	
Academic emphasis	1	817	.26	−.92	.97		
Collaboration leadership	1	632	.56	−.85	.99		
Collegial support	2	515	.52	−.64	.96		
Culture and climate	4	159	.48	−.41	.90		
Education culture	1	4949	.39	−.90	.98		
Learning partnership	15	13837	.50**	.06	.77		

(continued)

Table 11.3 (continued)

Variable	k	N	*R*	CI (confidence interval)		Q	Q_b
				Lower limit	Upper limit		
Overall	16	42354	.49**	.06	.76		
Perception of culture	1	60	.71	−.76	.99		
Professional commitment	1	356	.05	−.95	.96		
Professional development	1	291	.88	−.46	.10		
Program development	2	310	.53	−.63	.96		
Student attitudes	1	1026	.71	−.75	.99		
Teacher efficacy	2	218	.10	−.84	.89		
Teamwork and cooperation	1	749	.22	−.93	.97		
Unity of purpose	2	118	.48	−.67	.95		

*$p < .05$, **$p < .01$

RSCEQ Olivier (2001) [$r = .05$], School Analysis Model 2000 (SAM) [$r = -.67$, $p < .01$], School Work Culture Profile (SWCP) Snyder (1988) [$r = .53$, $p < .01$], SCS [$r = .57$, $p < .01$], SCTS Phillips (1996) [$r = .61$, $p < .01$], SCTS Wagner (2006) [$r = .71$, $p < .01$], SIQ-II (Webb and Pajares 1996) [$r = -.25$], SISI Standard Four School Culture [$r = -.16$] and TIMSS background [$r = .71$, $p < .01$].

Hypothesis H_6 which argued that the year of the studies is a moderator for the positive effect of school culture on student achievement was accepted as a result of the findings of the moderator analysis ($Q_b = 18.72$, $p < .01$). The impact levels of the variables were found as following: 1996–2000 [$r = -.31$], 2001–2005 [$r = .23$], 2006–2010 [$r = .48$, $p < .01$] and 2011–2015 [$r = .81$, $p < .01$].

The findings didn't support hypothesis H_7 which stated that the country in which the research took place is a moderator for the positive effect of school culture on student achievement ($Q_b = 1.29$, $p > .05$). The impact levels of the variables were as follows: Australia [$r = .39$], Belgium [$r = .26$], Cyprus [$r = .71$], Hong Kong [$r = .20$], Pakistan [$r = .08$], the USA [$r = .49$, $p < .01$] and Turkey [$r = .88$].

The findings didn't support hypothesis H_8 which suggested that the dimensions of school culture is a moderator for the positive effect of school culture on student achievement ($Q_b = 1.94$, p >05). The findings were as follows: Academic Emphasis [$r = .26$], Collaboration leadership [$r = .56$], Collegial support [$r = .52$], Culture and climate [$r = .48$], Education culture [$r = .39$], Learning partnership [$r = .50$, $p < .05$], Overall [$r = .49$, $p < .05$], Perception of culture [$r = .71$], Professional commitment [$r = .05$], Professional development [$r = .88$], Program development [$r = .53$], Student attitudes [$r = .71$], Teacher efficacy [$r = .10$], Teamwork and cooperation [$r = .22$] and Unity of purpose [$r = .48$].

11.4 Conclusion

This study which collected data from 51 studies including a total sample of 66,391 subjects examined the effect of school culture on student achievement, and the findings indicate that there is a positive relationship between school culture and student achievement. The impact value of school culture on student achievement was found to be .49. This result shows that school culture has a medium level effect on student achievement. According to the results of the moderator analysis, data collection tools and the year of the studies are moderators for the positive effect of school culture on student achievement.

The results of the moderator analysis also showed that the type of the publication, the sample group, school subject or assessment type, the country that the research took place in and the dimensions of school culture are not moderators for the positive effect of school culture on student achievement.

The result of this study is compatible with the studies found in the related literature (Brown 2005; Cunningham 2003; Fraley 2007; Gruenert 2005; Swindler 2009) which indicate that there is a correlation between the school culture and student achievement. In his meta-analysis study on the mediated effects of principal leadership on student achievement, Bulris (2009) examined the effect size of school culture on student achievement. He included 30 studies and 3,378 schools in his study and found that there is a strong moderate effect between school culture and student achievement in K-12 schools in the United States (r = .349) and that school culture is a significant mediating variable between principal leadership and student achievement. The findings of this study support the findings of Bulris as well.

References

Note. "*" References marked with an asterisk indicate studies included in the meta-analysis. The in-text citations to studies selected for meta-analysis are not followed by asterisks.

Alvesson, M. (1990). On the popularity of organizational culture. *Acta Sociologica, 33*(1), 31–49.

Alvesson, M. (2002). *Understanding organizational culture*. Great Britain: SAGE Publications.

Bates, R. J. (1987). Corporate culture, schooling, and educational administration. *Educational Administration Quarterly, 23*(4), 79–115.

Borenstein, M., Hedges, L. V., Higgins, J. P. T., & Rothstein, H. R. (2009). *Introduction to meta-analysis*. UK: Wiley.

Boyer, D. P. (2012). *A study of the relationship between the servant leader principal on school culture and student achievement in the lower Kuskokwim school district.* Doctoral dissertation, Grand Canyon University, Arizona, the USA.*

Broadway, K. (2010). *Student achievement: Impact of teacher certification method, school climate and culture, and level of support experienced by first-year teachers.* Doctoral dissertation, Texas A&M University-Commerce, the USA.*

Brown, K. L. Z. (2005). *An examination of the relationship between school culture and student achievement on Ohio sixth-grade proficiency tests*. Doctoral dissertation, Kent State University, the USA.*

Bulris, M. E. (2009). A *meta-analysis of research on the mediated effects of principal leadership on student achievement: examining the effect size of school culture on student achievement as an indicator of teacher effectiveness.* Doctoral dissertation, East Carolina University, the USA.

Chow, S. S. Y. (2006). *Understanding moral culture in Hong Kong secondary schools: Relationships among moral norm, moral culture, academic achievement motivation, and empathy.* Doctoral dissertation, Harvard University, the USA.*

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Hillside, NJ: Lawrence Erlbaum Associates.

Cunningham, B. C. A. (2003). *A study of the relationship between school culture and student achievement*. Doctoral dissertation, the University of Central Florida Orlando, the USA.*

Deal, Terrence E., & Peterson, Kent D. (2009). *Shaping school culture pitfalls, paradoxes, and promises* (2nd ed.). USA: Jossey-Bass.

Dumay, X. (2009). Origins and consequences of schools' organizational culture for student achievement. *Educational Administration Quarterly, 45*(4), 523–555.*

Feitler, F. C. & Gudgel, R. B. (1994). *Organizational culture questionnaire*. Teaching, Leadership, and Curriculum Studies. Kent, OH: Kent State University.

Fraley, C. A. (2007) *School cultures and their correlations with student achievement: An analysis of schools that have improved.* Doctoral dissertation, Indiana State University, the USA.*

Gay, L. R. (2002). *Educational research: Competencies for analysis and application.* Lahore: National Book Foundation

Gruenert, S. (2005). Correlations of collaborative school cultures with student achievement. *NASSP Bulletin, 89*(645), 43–55.*

Gruenert S. W. (1998). *Development of a school culture survey*. Doctoral dissertation, University of Missouri-Columbia, the USA.

Harris, L. C., & Ogbonna, E. (1998). A three-perspective approach to understanding culture in retail organizations. *Personnel Review, 27*(2), 104–123.

Hatchett, D. Y. (2010). *The impact of school culture, teacher job satisfaction, and student attendance rates on academic achievement of middle school students.* Doctoral dissertation, University of Louisville, Kentucky, the USA.*

Hedges, L. V., & Olkin, I. (1985). *Statistical method for meta-analysis*. United Kingdom: Academic Press.

Herndon, B. C. (2007) *An analysis of the relationships between servant leadership, school culture, and student achievement.* Doctoral dissertation, University of Missouri, Columbia, the USA.*

Hill, T. L. (2000). *The influence of gender and professional orientation of the elementary principal on school culture and student success.* Doctoral dissertation, University of Missouri—Columbia, the USA.*

Karadağ, E., Kılıçoğlu, G. & Yılmaz, D. (2014). Organizational cynicism, school culture, and academic achievement: the study of structural equation modeling. *Educational Sciences: Theory and Practice, 14*(1), 102–113.*

Koçyiğit, M. (2015). The effect of leadership on organizational culture. In K. Engin (Ed.), *Leadership and organizational outcomes, meta—Analysis of empirical studies*, (pp. 111–122). Springer International Publishing.

Kulinskaya, E., Morgenthaler, S., & Staudte, R. G. (2008). *Meta analysis: A guide to calibrating and combining statistical evidence*. London: Wiley.

Lamphere Jr., M. F. (2012). *Student achievement through the development of complete high school culture*. Doctoral dissertation, University of Colorado, Colorado Springs, the USA.*

Le Clear, E. A. (2005). *Relationships among leadership styles, school culture, and student achievement*. Doctoral dissertation, University of Florida, the USA.*

Liu, C. B. (2004). *The relationship between school culture and student achievement in Arizona elementary public schools*. Doctoral dissertation, the University of Arizona, the USA.*

Lorraine, R. R. D. O. (2011). *A study of the relationship between teachers' perception of principal's leadership practices and school culture to student achievement.* Doctoral dissertation, Southeastern Louisiana University, Louisiana, the USA.*

Marcoulides, G. A., Heck, R. H., & Papanastasiou, C. (2005). Student perceptions of school culture and achievement: Testing the invariance of a model. *International Journal of Educational Management, 19*(2), 140–152.*

Maslowski, R. (2006). A review of inventories for diagnosing school culture. *Journal of Educational Administration, 44*(1), 6–35.

Mees, G. W. (2008). *The relationships among principal leadership, school culture, and student achievement in Missouri middle schools.* Doctoral dissertation, University of Missouri, Columbia, the USA.*

Mitchell, B. D. (2008). *A quantitative study on positive school culture and student achievement on a criterion-referenced competency test.* Doctoral dissertation, University of Phoenix, The USA.*

Mok, M. & Flynn, M. (1998). Effect of catholic school culture on students' achievement in the higher school certificate examination: A multilevel path analysis. *Educational Psychology, 18* (4), 409–432.*

Myers, K. (2009). *The impact of teachers' perceptions of school culture on student achievement.* Doctoral dissertation, Walden University, the USA.*

Noe, J. (2012). *The relationship between principal's emotional intelligence quotient, school culture, and student achievement.* Doctoral dissertation, Liberty University, VA, the USA.*

Ogbonna, E., & Harris, L. (2002a). Organizational culture: A ten year, two-phase study of change in the UK food retailing sector. *Journal of Management Studies 39*(5), 673–706.

Ogbonna, E., & Harris, L. (2002b). Managing organisational culture: Insights from the hospitality industry. *Human Resource Management Journal 12*(1).

Olivier, D. F. (2001). *Teacher personal and school culture characteristics in effective schools: Toward a model of professional learning communities* (Doctoral dissertation).

Phillips, G. (1996). *Classroom rituals for at-risk learners.* Vancouver, BC: Edcserv, British Columbia School Trustees Publishing.

Powell, A. L. (2012). *The effects of workplace incivility, workplace bullying, and school culture on student achievement.* Doctoral dissertation, University of Louisville, Kentucky, the USA.*

Quiambao, J. E. (2004). *An analysis and comparison of school culture with academic achievement of middle school students with specific learning disabilities.* Doctoral dissertation, University of Central Florida Orlando, the USA.*

Quin, J. L. (2014). *The relationship between leadership practices, school culture, and student achievement in southwest Mississippi schools.* Doctoral dissertation, Northcentral University, Arizona, the USA.*

Rodriguez, S. (2008). *A study of the relationships among leadership, culture, and student achievement in catholic schools.* Doctoral dissertation, Florida Atlantic University, the USA.*

Rogers, J. K. (2009). *The relationship between school culture and student academic achievement.* Doctoral dissertation, University of Kentucky, the USA.*

Salfi, N. A. & Saeed, M. (2007). Relationship among school size, school culture and students' achievement at secondary level in Pakistan. *International Journal of Educational Management, 21*(7), 606–620.*

Sarros, J. C., Cooper, B. K., & Santora, J. C. (2011). Leadership vision, organizational culture, and support for innovation in not-for-profit and for-profit organizations. *Leadership and Organization Development Journal, 32*(3), 291–309.

Schein, E. H. (2010). *Organizational culture and leadership* (4th ed.). USA: Jossey-Bass.

Smith, S. L. (2007). *The relationship between school culture and student achievement in a large urban school district.* Doctoral dissertation, The University of Southern Mississippi, the USA.*

Snyder, K. J. (1988). *Pluralizing empowerment supervising groups of teachers.* Alexandria, VA: Association for Supervision and Curriculum Development.

Spies-Daley, S. (2004). *An examination of the relationship between leadership, cultures, climate, and student achievement in low performing inclusive population schools.* Doctoral dissertation, University of New Orleans, the USA.*

Swindler, N. H. (2009). *Middle school cultures and student achievement.* Doctoral dissertation, The University of Southern Mississippi, the USA.*

Vislocky, K. L. (2005). *The relationship between school culture and student achievement in middle schools.* Doctoral dissertation, University of Central Florida Orlando, the USA.*

Wagner, C. R. (2006). The school leader's tool for assessing and improving school culture. *Principal Leadership*, *7*(4), 41–44.

Webb, R. B., & Pajares, F. (1996). *School improvement questionnaire.* Gainesville, FL: Center for School Improvement, University of Florida.

Chapter 12
The Effect of School Climate on Student Achievement

Sabiha Dulay and Engin Karadağ

12.1 Introduction

When an organization is considered as a habitat, the provision of a positive climate is important for both the individuals and the organizations in terms of having good relationships within the organization and the survival of the organization in a healthy way. Many different definitions of climate were proposed since the first appearance of the concept, and it can be seen that there is no clear agreement about its definition. In the most general sense, organization climate is defined as the personality of an organization (Aydın 1986; Çelik 2012; Halpin and Croft 1962; Halpin 1966; Hoy and Miskel 2011). Hoy and Miskel (2011) have extended this definition and included it in the attributes describing the environment inside the organization, distinguishing an organization from another and affecting the behaviors of each member. The connection between climate and educational institutions started to be studied as late as the 1950s, and the basics of the concept of school climate have been founded by Halpin and Croft (1962). The interest towards school climate increased subsequently, and researchers started to focus on examining the climate within the school and classroom. However, it was observed that the consensus problem experienced in the conceptualization of organizational climate was also valid for the definition of school climate. Hoy and Miskel (2011) have adapted their definition of organizational climate, and they have defined school climate as a number of characteristics that separate schools from each other and that affect the behavior of each member of the school. According to Talbert (2002), school climate expresses the sum of the values, cultures, health and safety

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practices and work and organizational structures that allow the school to fulfill its function and to respond in certain manners.

School climate, which can be described as the psychosocial effect of organizational environment on the students and adults inside the school, includes the school's norms, goals, targets, values, relations, organizational structure and learning-teaching methods (Cohen and Geier 2010). In this context, school climate is formed by different parts of the school, such as the physical environment that provides an intimate and positive learning, the social environment that encourages positive communication and interaction among shareholders, the emotional environment that creates a sense of belonging especially among students and the academic environment that develops a learning system encouraging everyone towards achievement (Tableman 2004). At the same time, school climate can also be defined as the atmosphere created by social relations, values, attitudes and feelings shared by the actors of the school. Based on all these conceptualizations about school climate, it is possible to conclude that climate expresses the environment or personality of the school, and it is associated with the behaviors of the teachers, students and other members and stockholders of the educational institutions. Studies have revealed that climate is associated with various outcomes for students, teachers and schools. In this context, climate is associated with the following concepts and issues: organizational performance (Litwin 1968), morale (Alsop 1984), job satisfaction (Beckley 2012; Williams 2009), general behavior problems (Wang et al. 2010), a sense of belonging to the school (Waters et al. 2009), motivation (Cheema and Kitsantas 2014) and school attendance (Brookmeyer et al. 2006; Voight et al. 2011). In this regard, school climate, which is seen as the spirit and heart of the school, is perceived as an important factor for student outcomes and overall performance of the students (Hoy et al. 1991).

School climate is arguably an important component of successful and effective schools (Koth et al. 2008). In this context, the formation of a positive school climate is one of the basic requirements for the realization of effective learning. A positive school climate provides an environment where students feel themselves valuable; at the same time, it allows students to increase their academic achievement. In particular, there are numerous studies revealing that there is a positive relationship between school climate and student achievement (Agnew 1981; Allen 2015; Anderson 1982; Bear et al. 2014; Carwell 2012; Davis 2010; Hough and Schmitt 2011; Williams et al. 2008). Johnson and Stevens (2006) have examined the relationship between school climate in terms of teachers' perceptions and achievement and concluded that teachers with a positive school climate perception increase student achievement. In this regard, school climate in terms of students and teachers should be considered as an important factor for improving student achievement. A safe and supportive school environment in which students develop positive relations, get respected, and are genuinely engaged with their work, affects achievement (Tschannen-Moran and Barr 2004). Similarly, it is argued that school climate is a predictor of important organizational outcomes, such as academic achievement, school achievement, violence prevention, healthy development of students and teacher turnover (Cohen et al. 2009). It is, therefore, important to examine the concept of climate and its relation with the lives of schools and individuals, with establishing a positive atmosphere and with academic achievement.

This study investigates the effect of self-concept on student achievement. In addition, the factors that are hypothesized to affect the average effect size obtained in the study were set as moderators. These are the following: *(i)* the publication year of research, *(ii)* the publication type of research, *(iii)* the country (culture) where the research was carried out, *(iv)* the course in which the achievement was measured and *(v)* the school level. All these variables, along with the results of previous research results, were used to test the following hypotheses of this study:

H_1 Climate has a positive effect on student achievement.
H_2 School subject or assessment type is a moderator for the positive effect of climate on student achievement.
H_3 Country (culture) in which the study was conducted is a moderator for the positive effect of climate on student achievement.
H_4 Publication year of research is a moderator for the positive effect of climate on student achievement.
H_5 Publication type of research is a moderator for the positive effect of climate on student achievement.
H_6 School grade (level) is a moderator for the positive effect of climate on student achievement.

12.2 Method

12.2.1 Study Design

In this study, the effect of climate on student achievement was tested with a meta-analysis design.

12.2.2 Review Strategy and Criteria for Inclusion/Exclusion

To determine the research studies to include in the meta-analysis, the Science-Direct, Proquest and Ebsco academic databases were used to conduct a literature review. For this process, the terms *climate* and *student achievement/ student success* included in the titles of the studies were used to screen the research studies. The deadline for the research studies included in the research was identified as January 2016. Doctoral dissertations and peer-reviewed journals were included in the study.

Many strategies were used to identify the research studies that were appropriate for the meta-analysis of the study. First, a research study pool (237 research studies) was established; it included all studies with climate and student achievement/success in their titles. The abstracts of these studies were reviewed, and 90 research studies were found to be appropriate to include in the study. The results of the examination found that 90 of the research studies in the pool were appropriate, and 147 were not found to be appropriate. The descriptive statistics of the 90 research studies included in the analysis are presented in Table 12.1.

The criteria for inclusion of the research studies in the analysis study were identified as follows:

- To have the statistical information necessary for correlational meta-analysis (n and r, or R^2 values)
- To be a study measuring the correlation climate and student achievement/ success.

Reasons for not including a research study in the meta-analysis:

- Having no quantitative data (qualitative research)
- Not having a correlation coefficient
- Not focusing on student achievement
- Not focusing on climate.

12.2.3 Coding Process

The coding process was essentially a data sorting process used to ascertain which data were clear and suitable for the study. In this scope, a coding form was developed before the statistical analysis was conducted, and the coding was conducted according to the form. The main aim was to develop a specific coding system that allowed the study to see the entirety of the research studies in general and that would not miss any characteristics of each individual research study. The coding form developed in the study was comprised of:

- References for the research
- Sample information

Table 12.1 Characteristics of the studies included in the meta-analysis

Options		1	2	3	4	5	Total
Publication year		Before 1995	1996–2000	2001–2005	2006–2010	2011–2015	–
	n	14	11	15	11	39	90
	%	15.5	12.2	16.7	12.2	43.3	100
Publication type		Dissertations	Articles				
	n	74	16				90
	%	82.2	17.3				100

- Publication types and years of researches
- School subject or assessment type
- Methodological information
- Quantitative values.

12.2.4 Statistical Processes

The effect size acquired in meta-analysis is a standard measure value used in the determination of the strength and direction of the relationship in the study (Borenstein et al. 2009). Pearson's correlation coefficient (r) was determined to be the effect size in this study. Because the correlation coefficient has a value between *+1* and *−1,* the *r* value calculated was evaluated by converting this value into the value as it appears in the *z* table (Hedges and Olkin 1985). Provided that more than one correlation value is given between the same structure categories in correlational meta-analysis studies, two different approaches are used in the determination of the one to be used in the meta-analysis (Borenstein et al. 2009; Kulinskaya et al. 2008). For this study, (*i*) first, if the correlations were independent, all the related correlations were included in the analysis and were considered to be independent studies, and (*ii*) if there were dependent correlations, then the *highest correlation value* was accepted. A *random effect model* was used for the meta-analysis processes in this study. The *Comprehensive Meta-Analysis* program was used in the meta-analysis process.

12.2.5 Moderator Variables

To determine the statistical significance of the differences between the moderators of the study, only the Q_b values were used. Four moderator variables that were expected to have a role in the average effect size were identified in the study. The first of these considered is *the publication years of researches* as a moderator in regards to the relationship between climate and student achievement. The second is the *publication type of researches.* The rest are the *country (culture)* in which the study conducted *school subject/assessment type* and *school grade*.

12.2.6 Publication Bias

A funnel plot for the research studies included in the meta-analysis of can be seen in Fig. 12.1. Evidence that publication bias affected the research studies included in the meta-analysis can be seen in Fig. 12.1. A serious asymmetry would be expected in the funnel plot if there were a publication bias. The concentration of plots on one

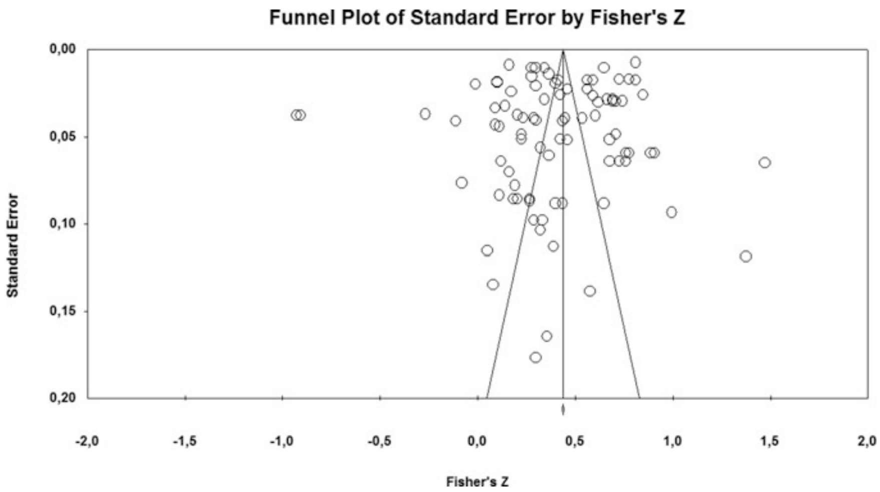

Fig. 12.1 Effect size funnel for publication bias

Table 12.2 Duval and Tweedie's trim and fill test results

	Excluded studies	Point estimate	CI (confidence interval)		Q
			Lower limit	Upper limit	
Observed values		0,41	0,40	0,41	12385.5*
Corrected values	0	0,41	0,40	0,41	12385.5*

*$p < .01$

side under the line of average effect size, particularly in the bottom section of the funnel, suggests the probability of a publication bias in the research studies. In this study, no evidence of partiality of the publications was observed in any of the 90 data subjected to meta-analysis.

Although no partiality in publications was observed in the funnel plot, the results of Duval and Tweedie's trim and fill test, which was applied to determine the effect of partiality in publications acquired with the meta-analysis using the random effect model, are given in Table 12.2. As is seen in Table 12.2, there is no difference between the effect observed and the artificial effect size created to fix the effect of the partiality of publications. The research on each side of the center line is symmetrical, and this is the indicator of non-difference. Because there is no evidence indicating lost data on either side of the center line, the difference between the fixed effect size and observed effect size is zero.

12.3 Findings

The results of the meta-analysis about the relationship between climate and student achievement are displayed in Table 12.3. The findings supported hypothesis H_1 which formulated that there is a positive relationship between climate and student achievement. The effect size of climate on student achievement was calculated as .38 which showed that climate had a medium level effect (see Cohen 1988) on student achievement.

The first moderator analysis supported hypothesis H_2 which stated that the course in which the achievement was measured plays a moderator role in the effect of climate on student achievement. According to the moderator analysis, it was found that climate had a significant low level effect on reading skill [r = .30] and a medium level effect on cumulative grade average [r = .33], mathematics [r = .36], English [r = .57], science [r = .58] and social sciences [r = .58]. The effect size differences of the climate among the various courses in which the achievement has been measured were found to be statistically significant ($Q_b = 15.21$, $p < .05$).

The findings did not support hypothesis H_3 which formulated that the country (culture) where the research was carried out plays a moderator role in the effect of climate on student achievement. Although the effect size differences according to the culture type (country) of the research were not found to be significant ($Q_b = .26$, $p > .05$), the effect of climate on student achievement was at a medium level both in horizontal individualistic cultures [r = .38] and in vertical-collectivist countries [r = .52].

The findings of this study supported hypothesis H_4 hypothesis which formulated that the publication year of the research plays a moderator role in the effect of climate on student achievement. As a result of the moderator analysis, the effect size differences between the publication years of the studies examined were found to be statistically significant ($Q_b = 45.17$, $p < .05$). In particular, in the studies published before 1995 (r = .16) the effect of climate on student achievement was at a low level, whereas in the studies published between in the years 2001–2005 [r = .57], 2006–2010 [r = .45] and 2011–2015 [r = .46] this effect was at a medium level.

The findings did not support hypothesis H_5 hypothesis which formulated that the publication type of the research plays a moderator role in the effect of climate on student achievement. According to the moderator analysis, the effect size difference of the publication types was not found to be statistically significant ($Q_b = 2.87$, $p > .05$). The effect of climate on student achievement was at a medium level both in the articles [r = .48] and in dissertations [r = .36].

The findings of the moderator analysis did not support hypothesis H_6 which formulated that the school grade (level) plays a moderator role in the effect of climate on student achievement. Although the effect size differences between the levels of education were not found to be statistically significant ($Q_b = 2.20$, $p > .05$), the effect of climate on student achievement is statistically significant for all education levels except for the university [r = .29]. In particular, the effect of climate on student achievement is at a medium level for primary school [r = .40], secondary school [r = .36], high school [r = .35] and for mixed groups where students from different levels are together [r = .52].

Table 12.3 Findings of the correlations between climate and student achievement: results of the meta-analysis

Variable	k	N	*r*	CI (confidence interval)		Q	Q_b
				Lower limit	upper limit		
Climate	90	148.504	.38.8*	.33	.43.9	12385.15*	
Moderator [course]							**15.21***
GPA	42	42.981	.33*	.25	.41		
Mathematic	23	63.299	.36*	.25	.46		
English	10	12.431	.57*	.43	.68		
Reading ability	9	22.127	.30*	.12	.47		
Social sciences	3	3.833	.61*	.36	.78		
Science	3	3.833	.58*	.32	.76		
Moderator [country]							**0.26**
Horizontal individualistic	1	55	.52	−.06	.83		
Vertical-collectivist	89	148.499	.38*	.33	.43		
Moderator [publication year]							
Before 1995	14	13.720	.16**	.02	.30		**45.17***
1996–2000	11	13.267	.04	−.12	20		
2001–2005	15	5.465	.57*	.47	.66		
2006–2010	11	24.688	.45*	.31	.57		
2011–2015	39	91.364	.45*	.37	.51		
Moderator [Publication Type]							**2.87**
Dissertation	16	50.874	.48	.36	.59		
Article	74	97.630	.36	.30	.42		
Moderator [school grade]							**2.20**
Elementary	42	9.772	.40*	.32	.47		
Secondary	25	12.447	.36*	.25	.46		
High	15	12.622	.35*	.21	.48		
Mixed	5	3.356	.52*	.29	.69		
University	3	4	.29	−.05	.58		

$^*p < .01$, $^{**}p < .05$

12.4 Conclusion

This meta-analysis, which aimed to determine the effect size of climate on student achievement, included 90 studies. In this study, the moderator variables were the publication year and publication type of the research, the country (culture) where the research was carried out, the course in which the achievement was measured and the level of education. The meta-analysis results of the study showed that climate had a medium level positive effect on student achievement. This finding supports the argument in the literature that the climate is associated with student achievement (Agnew 1981; Allen 2015; Anderson 1982; Bear et al. 2014; Carwell 2012; Cohen et al. 2009; Davis 2010; Hough and Schmitt 2011; Goddard et al. 2000; Tschannen-Moran and Barr 2004; Williams et al. 1992).

The findings of the moderator analysis in terms of the course in which the achievement was measured showed that the effect size differences among courses were statistically significant. In particular, it was found that climate had a significant low level effect on reading skill [r = .30] and a medium level effect on cumulative grade average [r = .33], mathematics [r = .36], English [r = .57], science [r = .58] and social sciences [r = .58]. This finding is supported by similar studies which examine the relationship between climate and the academic achievement of the students. In this regard, it is argued that climate is positively associated with reading skill (Allen 2015; Fleenor 2015; Smallwood 2014; Demery 2000), cumulative grade average (Carter 2015; Hopson et al. 2014; Vaux 2015), mathematics (Bear et al. 2014; Carwell 2012; Demery 2000), English (Bear et al. 2014; Bergren 2014), science (Spence 2003) and social sciences (Bergren 2014; Spence 2003).

The effect size difference of country (culture) type was not statistically significant. On the one hand, the effect of climate on student achievement was at a medium level in horizontal individualistic cultures [r = .38]. On the other hand, this effect is not statistically significant in vertical-collectivist countries [r = .52]. The review of the studies included in the meta-analysis showed that only one study (Dincer et al. 2012) was conducted in a vertical-collectivist culture, and the high number of studies conducted in horizontal-individualistic cultures was striking.

Regarding the publication year and publication type, the difference in the effect size of climate on student achievement is statistically significant for the publication year, while this effect size is not significant in terms of the publication type. It was found that the effect of climate on student achievement was at a low level for the studies published before 1995 [r = .16], whereas the effect of climate on student achievement was at a medium level for the studies published in the years 2001–2005 [r = .57], 2006–2010 [r = .45] and 2011–2015 [r = .46]. It can be seen that this effect rapidly increased between 2001 and 2005, whereas it remained similar in the subsequent years. In the light of the above findings, it is possible to conclude that the number of studies about climate increased after 1995. In this context, the concept of organizational climate, including its application in the school environment, became the focus of many studies in the literature since the beginning of the 20th century (Bergren 2014). The review of the effect sizes according to publication type showed that the effect of climate on student achievement did not change in the articles and dissertations; there was a medium level effect in both types.

Finally, the moderator analysis of the education levels showed that the effect size differences among the various education levels were not statistically significant. Despite this result, the effect of climate on student achievement was significant for all education levels except university. The highest effect was observed in the mixed group in which students from different levels are mixed together, whereas the lowest effect was in high school.

The results about the effect of climate on student achievement are reviewed as a whole and summarized as below:

- Climate has a medium level positive effect size [$r = 38.8$] on student achievement.
- Regarding the moderator variables, the country (culture) where the research was carried out, the school grade, and the publication type do not play a moderator role in the effect size of climate on student achievement, whereas the course in which the achievement was measured and the publication year play a moderator role in the effect size of climate on student achievement.

Based on the results obtained from this study, it is concluded that school climate, which is an important factor in creating a heathy and positive atmosphere in schools and in ensuring the effectiveness of interpersonal relations, affects the academic achievement of students positively. In other words, school climate appears as one of the basic factors that are crucial for predicting and increasing student achievement. Accordingly, this meta-analysis study is important in terms of revealing that the studies focusing on the relationship between climate and student achievement should be deeply examined. In order to examine the effect of climate on academic achievement, further qualitative and comparative meta-analysis studies should be conducted.

References

Note. "*" References marked with an asterisk indicate studies included in the meta-analysis. The in-text citations to studies selected for meta-analysis are not followed by asterisks.

Agnew, E. M. (1981). *The relationship between elementary school climate and student achievement* (Order No. 8215489). Available from ProQuest Dissertations and Theses Global. (303054014). Retrieved from http://search.proquest.com/docview/303054014?accountid=16716*

Allen, N. J. (2015). *Transformational leadership and its relationship to school climate and student achievement* (Order No. 3662981). Available from ProQuest Dissertations and Theses Global. (1687828500). Retrieved from http://search.proquest.com/docview/1687828500?accountid=16716*

Alsop, W. E. (1984). *The relationships between leadership style, climate, and morale as perceived by the faculty of Wyoming community college (Unpublished doctoral dissertation)*. Laramie, Wyoming: University of Wyoming.

Anderson, C. (1982). The search for school climate: A review of the research. *Review of Educational Research, 52*(30), 368–420.

Aydın, M. (1986). *Çağdaş eğitim denetimi*. Ankara: İm Eğitim Yayın Danışmalık.

Bear, G. G., Yang, C., Pell, M., & Gaskins, C. (2014). Validation of a brief measure of teachers' perceptions of school climate: Relations to student achievement and suspensions. *Learning Environments Research*, *17*(3), 339–354.*

Beckley, G. M. (2012). *Catholic school leadership: School climate and culture and the influence on principal satisfaction (Unpublished doctoral dissertation)*. Nashville: Trevecca Nazarene University.

Bedford, W. P., Jr. (1987). *Components of school climate and student achievement in Georgia middle schools* (Order No. 8712651). Available from ProQuest Dissertations and Theses

Global.(303573915). Retrieved from http://search.proquest.com/docview/303573915?accountid=16716*

Bergren, D. A. (2014). *The impact of school climate on student achievement in the middle schools of the commonwealth of Virginia: A quantitative analysis of existing data* (Order No. 3615518). Available from ProQuest Dissertations and Theses Global. (1532779626). Retrieved from http://search.proquest.com/docview/1532779626?accountid=16716*

Borenstein, M., Hedges, L. V., Higgins, J. P. T., & Rothstein, H. R. (2009). *Introduction to meta-analysis*. UK: Wiley.

Brookmeyer, K. A., Fanti, K. A., & Henrich, C. C. (2006). Schools, parents, and youth violence: A multilevel, ecological analysis. *Journal of Clinical Child and Adolescent Psychology, 35,* 504–514. doi:10.1207/s15374424jccp3504_2

Caldwell, M. B. (1998). *Individual and collective self-esteem, school climate, and achievement in African–American, White, and Latino children* (Order No. 9831402). Available from ProQuest Dissertations and Theses Global.(304460700). Retrieved from http://search.proquest.com/docview/304460700?accountid=16716*

Callison, J. F. (2002). *Teacher assessment of school climate and its relationship to student achievement* (Order No. 3074284). Available from ProQuest Dissertations and Theses Global. (305558207). Retrieved from http://search.proquest.com/docview/305558207?accountid=16716*

Carter, J. A. (2015). *An examination of the relationship among teacher self-efficacy, school climate, and student achievement* (Order No. 3663846). Available from ProQuest Dissertations and Theses Global. (1708219410). Retrieved from http://search.proquest.com/docview/1708219410?accountid=16716*

Carwell, T. L. (2012). *The impact of the Stanford math intervention program and school climate on mathematics achievement levels of female middle school students* (Order No. 3514803). Available from ProQuest Dissertations and Theses Global. (1021723760). Retrieved from http://search.proquest.com/docview/1021723760?accountid=16716*

Çelik, V. (2012). *Okul kültürü ve yönetimi*. Ankara: Pegem.

Cheema, J. R., & Kitsantas, A. (2014). Influences of disciplinary classroom climate on high school student self-efficacy and mathematics achievement: A look at gender and racial–ethnic differences. *International Journal of Science and Mathematics Education*, *12*(5), 1261–1279.*

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Hillside, NJ: Lawrence Erlbaum Associates. Columbia University.

Cohen, J., & Geier, V. K. (2010). School climate brief: *School climate research summary. Center for Social and Emotional Education*, *1*(1). Retrieved from http://www.schoolclimate.org/climate/papers-briefs

Cohen, J., McCabe, E., Michelli, N., & Pickeral, T. (2009). School climate: Research, policy, practice, and teacher education. *Teachers College Record, 111*(1), 180–213.

Cook, M. N. (1989). *School climate, teacher morale, and achievement: Effects and relationships* (Order No. 9107585). Available from ProQuest Dissertations and Theses Global. (303801151). Retrieved from http://search.proquest.com/docview/303801151?accountid=16716*

Dadabo, D. (2014). *Retrospective and current perceptions of classroom climate on engagement and achievement in high school* (Order No. 3625784). Available from ProQuest Dissertations and Theses Global. (1556631425). Retrieved fromhttp://search.proquest.com/docview/1556631425?accountid=16716*

Davis, B. W. (2010). *The relationship of principal leadership style as it affects school climate and student achievement* (Order No. 3425719). Available from ProQuest Dissertations and Theses Global. (759831811). Retrieved from http://search.proquest.com/docview/759831811?accountid=16716*

Demery, J. (2000). *The relationship between teachers' perceptions of school climate, racial composition, socioeconomic status, and student achievement in reading and mathematics* (Order No. 9964309). Available from ProQuest Dissertations and Theses Global. (304629891). Retrieved from http://search.proquest.com/docview/304629891?accountid=16716*

DiMuzio, S. R. (1989). *School size, school climate and student achievement in secondary schools of New York state* (Order No. 9013539). Available from ProQuest Dissertations and Theses

Global. (303740370). Retrieved from http://search.proquest.com/docview/303740370?accountid=16716*
Dincer, A., Yesilyurt, S., & Takkac, M. (2012). The Effects of autonomy-supportive climates on EFL learner's engagement, achievement and competence in english speaking classrooms. *Procedia-Social and Behavioral Sciences*, *46*, 3890–3894.*
Djigic, G., & Stojiljkovic, S. (2011). Classroom management styles, classroom climate and school achievement. *Procedia-Social and Behavioral Sciences*, *29*, 819–828.*
Ermold, C. M. (2011). *A correlational study of student achievement and school climate* (Order No. 3466611). Available from ProQuest Dissertations and Theses Global. (885178164). Retrieved from http://search.proquest.com/docview/885178164?accountid=16716*
Farr, D. M. (1998). *School climate and student achievement during a school improvement effort* (Order No. 9908470). Available from ProQuest Dissertations and Theses Global. (304439944). Retrieved from http://search.proquest.com/docview/304439944?accountid=16716*
Fleenor, L. A. (2015). *The relationship between student perceptions of classroom climate and TVAAS student achievement scores in title I schools* (Order No. 3708211). Available from ProQuest Dissertations and Theses Global. (1691069701). Retrieved from http://search.proquest.com/docview/1691069701?accountid=16716*
Gentile, M. (1997). *The relationship between middle school teachers' perceptions of school climate and reading and mathematics achievement* (Order No. 9819482). Available from ProQuest Dissertations and Theses Global. (304464522). Retrieved from http://search.proquest.com/docview/304464522?accountid=16716*
Gibbs, E. L. (2000). *A diversified community: Relationship between teachers' perceptions of school climate and student achievement in selected southeast Texas elementary schools* (Order No. 9980151). Available from ProQuest Dissertations and Theses Global. (304666204). Retrieved from http://search.proquest.com/docview/304666204?accountid=16716*
Goddard, D. R., Sweetland, R. S., & Hoy, W. K. (2000). Academic emphasis of urban elementary schools and student achievement in reading and mathematics: A multilevel analysis. *Educational Administration Quarterly, 36*(5), 683–702.
Griffin, C. B. (2014). *School racial climate and the academic achievement of African American high school students: The mediating role of school engagement* (Order No. 3620954). Available from ProQuest Dissertations and Theses Global. (1540757475). Retrieved from http://search.proquest.com/docview/1540757475?accountid=16716*
Griswold, R. D. (2001). *An analysis of the relationship between the organizational climate of athletic training education programs and student achievement* (Order No. 3015994). Available from ProQuest Dissertations and Theses Global. (252251843). Retrieved from http://search.proquest.com/docview/252251843?accountid=16716*
Haggard, D. D. (1982). *An evaluation of the influence of organizational changes in intermediate schools upon the relationship between students' perceptions of school climate and their achievement of basic skills* (Order No. 8311510). Available from ProQuest Dissertations and Theses Global. (303266042). Retrieved from http://search.proquest.com/docview/303266042?accountid=16716*
Halpin, A. W. (1966). *Theory and research in administration*. NewYork, NY: Macmillan.
Halpin, A. W., & Croft, D. B. (1962). *The organizational climate of schools*. Chicago: Midwest Administrative Center, The University of Chicago.
Hampton, K. B. (2008). *The perceptions of teachers on the relationship between school climate and student achievement* (Order No. 3324001). Available from ProQuest Dissertations and Theses Global. (304840065). Retrieved from http://search.proquest.com/docview/304840065?accountid=16716*
Hannum, J. W. (1994). *The organizational climate of middle schools, teacher efficacy, and student achievement* (Order No. 9514121). Available from ProQuest Dissertations and Theses Global. (304132304). Retrieved from http://search.proquest.com/docview/304132304?accountid=16716*
Hedges, L. V., & Olkin, I. (1985). *Statistical method for meta-analysis*. United Kingdom: Academic Press.

Hill, A. N. (1999). *Examining the effects of school climate, student background, teacher expectations, and school-community integration on academic achievement among high poverty urban schools* (Order No.9929275). Available from ProQuest Dissertations and Theses Global. (304506034). Retrieved from http://search.proquest.com/docview/304506034?accountid=16716*

Hopson, L. M., Schiller, K. S., & Lawson, H. A. (2014). Exploring linkages between school climate, behavioral norms, social supports, and academic success. *Social Work Research*, *38*(4), 197–209.*

Hough, D. L., & Schmitt, V. L. (2011). An ex post facto examination of relationships among the developmental designs professional development model/classroom management approach, school leadership, climate, student achievement, attendance, and behavior in high poverty middle grades schools. *Middle Grades Research Journal*, *6*(3), 163–176.*

Hoy, W. K., & Miskel, C. G. (2011). *Eğitim yönetimi: Teori, araştırma ve uygulama* (Çev. Ed. S. Turan). Ankara: Nobel.

Hoy, W. K., Tarter, C. J., & Kottkamp, R. B. (1991). *Open schools, healthy schools measuring organizational climate*. Newbury Park, CA: Sage.

Ibanez, D. T. (1991). *The relationship between organizational learning climate and achievement scores of secondary students in the Northside independent school district middle schools* (Order No. 9216874). Available from ProQuest Dissertations and Theses Global. (303937851). Retrieved from http://search.proquest.com/docview/303937851?accountid=16716*

Imperial, D. L. (2005). *The relationship between organizational climate and multicultural education on student achievement in elementary-age children of military parents (COMP) schools* (Order No. 3197796). Available from ProQuest Dissertations and Theses Global. (305403146). Retrieved from http://search.proquest.com/docview/305403146?accountid=16716*

Johnson, B. (1998). *The relationships between elementary school teachers' perceptions of school climate, student achievement, teacher characteristics, and community and school context* (Order No. 9911757). Available from ProQuest Dissertations and Theses Global. (304439207). Retrieved from http://search.proquest.com/docview/304439207?accountid=16716*

Johnson, B., & Stevens, J. (2006). Student achievement and elementary teachers perceptions of school climate. *Learning Environments Research, 9*, 111–122.*

Jones, J. R. (2014). *College self-efficacy and campus climate perceptions as predictors of academic achievement in African American males at community colleges in the state of Ohio* (Order No. 3631441). Available from ProQuest Dissertations and Theses Global. (1586788946). Retrieved from http://search.proquest.com/docview/1586788946?accountid=16716*

Kelly, R. A. (2004). *Principal leadership and school climate: The effects on student achievement in magnet schools* (Order No. 3164800). Available from ProQuest Dissertations and Theses Global. (305051616). Retrieved from http://search.proquest.com/docview/305051616?accountid=16716*

Koth, C. W., Bradshaw, C. P., & Leaf, P. J. (2008). A multilevel study of predictors of student perceptions of school climate: The effect of classroom-level factors. *Journal of Educational Psychology, 100*(1), 96–104.

Kulinskaya, E., Morgenthaler, S., & Staudte, R. G. (2008). *Metaanalysis: A guide to calibrating and combining statistical evidence*. London: Wiley.

Kullar, P. (2011). *A multi-site case study: The effect of principal leadership on school climate and student achievement in charter schools in Los Angeles, California* (Order No. 3449691). Available from ProQuest Dissertations and Theses Global. (863480238). Retrieved from http://search.proquest.com/docview/863480238?accountid=16716*

Litwin, G. H., & Stringer, R. A. (1968). *Motivation and organizational climate.*

Lopez, R. E. (2015). *School climate, developmental assets, and academic success in KIPP hispanic students* (Order No. 3724694). Available from ProQuest Dissertations and Theses Global. (1727612307). Retrieved from http://search.proquest.com/docview/1727612307?accountid=16716*

McKay, L. M. (2012). *An examination of the relationship between classroom climate and student math achievement Belize district high schools* (Order No. 3525635). Available from ProQuest Dissertations and Theses Global. (1039142341). Retrieved from http://search.proquest.com/docview/1039142341?accountid=16716*

Montoya, A. L. (1986). *School climate perceptions and student achievement (rural schools)* (Order No. 8626096). Available from ProQuest Dissertations and Theses Global. (303516896). Retrieved from http://search.proquest.com/docview/303516896?accountid=16716*

Moreland, J. Y. (1984). *A study of the relationships among student achievement, school learning climate, and personality types of elementary school principals* (Unpublished doctoral dissertation). Georgia State University, Atlanta.*

Outhier, T. N. (1978). *A study of the relationship between student achievement and student perception of school climate* (Unpublished doctoral dissertation). The University of Tulsa, Michigan.*

Parish, J. B. (2002). *School climate and state standards: A study of the relationships between middle school organizational climate and student achievement on the Virginia standards of learning tests* (Order No. 3041368). Available from ProQuest Dissertations and Theses Global. (276127699). Retrieved from http://search.proquest.com/docview/276127699?accountid=16716*

Pavignano, D. A. (1990). *The influence of organizational structure and climate on academic achievement in elementary schools* (Unpublished doctoral dissertation). The State University of New Jersey, New Brunswick.*

Pompa, J. L. (2007). *The impact of teacher perceptions of school climate on student academic achievement* (Order No. 3302643). Available from ProQuest Dissertations and Theses Global. (304739764). Retrieved from http://search.proquest.com/docview/304739764?accountid=16716*

Price, J. D. (1991). *The effects of organizational climate on elementary student academic achievement in the Judson independent school district* (Order No. 9216876). Available from ProQuest Dissertations and Theses Global. (304016394). Retrieved from http://search.proquest.com/docview/304016394?accountid=16716*

Rhoden, V. (2012). *The examination of the relationships among secondary principals' leadership behaviors, school climate, and student achievement in an urban context* (Order No. 3517035). Available from ProQuest Dissertations and Theses Global. (1030961882). Retrieved from http://search.proquest.com/docview/1030961882?accountid=16716*

Roberts, L. S. M. (1998). *The relationship of the communication styles of public school principals in West Virginia and their schools' climates to student achievement* (Order No. 9999491). Available from ProQuest Dissertations and Theses Global. (304454751). Retrieved from http://search.proquest.com/docview/304454751?accountid=16716*

Schulman, J. (2002). *The effects of leadership styles and school climate on student achievement* (Order No. 3056157). Available from ProQuest Dissertations and Theses Global. (252280446). Retrieved from http://search.proquest.com/docview/252280446?accountid=16716*

Schyns, B., & Schillng, J. (2013). How bad are the effects of bad leaders? A meta-analysis of destructive leadership and its outcomes. *The Leadership Quarterly, 24,* 138–158.

Sherblom, S. A., Marshall, J. C., & Sherblom, J. C. (2006). The relationship between school climate and math and reading achievement. *Journal of Research in Character Education*, *4*(1–2), 19–31.*

Smallwood, G. W. (2014). *The impact of school climate on the achievement of elementary school students who are economically disadvantaged A quantitative study* (Order No. 3623259). Available from ProQuest Dissertations and Theses Global. (1549543288). Retrieved from http://search.proquest.com/docview/1549543288?accountid=16716*

Smith, K. M. (2008). *The impact of district and school climate on student achievement* (Order No. 3302005). Available from ProQuest Dissertations and Theses Global. (304446786). Retrieved from http://search.proquest.com/docview/304446786?accountid=16716*

Spence, A. C. (2003). *A study of climate and achievement in elementary schools* (Doctoral dissertation). Retrieved from Dissertations and Theses: Full Text. (Publication No. AAT 3091129).*

Tableman, B. (2004). School climate and learning. *Best Practices Brief, 31,* 1–10.

Talbert, J. M. (2002). Professional communities and the artisan model o f teaching. *Teachers and Teaching, 5*(3), 325–343.

Taylor, E. (2014). *Race achievement gap: How motivation orientation, school climate, and academic self-concept predict school achievement* (Order No. 3579647). Available from ProQuest Dissertations and Theses Global. (1508513500). Retrieved from http://search.proquest.com/docview/1508513500?accountid=16716*

Tschannen-Moran, M., & Barr, M. (2004). Fostering student learning: The relationship of collective teacher efficacy and student achievement. *Leadership and Policy in Schools, 3*(3), 189–209.

Uline, C., & Tschannen-Moran, M. (2008). The walls speak: The interplay of quality facilities, school climate, and student achievement. *Journal of Educational Administration*, *46*(1), 55–73.*

Varona, M., Jr. (1994). *Second language learners' perceptions of school climate and educational satisfaction and their relationships to academic achievement and the mediational effects of gender* (Order No. 9517539). Available from ProQuest Dissertations and Theses Global. (304117481). Retrieved from http://search.proquest.com/docview/304117481?accountid=16716*

Vasquez, D. (2011). *Organizational climate and student achievement in Belizean secondary schools* (Order No. 3540365). Available from ProQuest Dissertations and Theses Global. (1112251884). Retrieved from http://search.proquest.com/docview/1112251884?accountid=16716*

Vaux, N. D. (2015). *Academic optimism and organizational climate as predictors of academic achievement and school effectiveness* (Order No. 3711942). Available from ProQuest Dissertations and Theses Global. (1698504036). Retrieved from http://search.proquest.com/docview/1698504036?accountid=16716*

Voight, A., Nixon, C. T., & Nation, M. (2011). *The relations between school climate and key educational outcomes for urban middle school students*. Paper presented at the annual meeting of the American Education Research Association, New Orleans, LA, 12 April 2009. doi:10.1007/s10464-005-8629-8.

Wang, M. T., Selman, R. L., Dishion, T. J., & Stormshak, E. A. (2010). A tobit regression analysis of the covariation between middle school students' perceived school climate and behavioral problems. *Journal of Research on Adolescence, 20,* 274–286. doi:10.1111/j.1532-7795.2010.00648.x

Waters, S., Cross, D., & Runions, K. (2009). Social and ecological structures supporting adolescent connectedness to school: A theoretical model. *Journal of School Health, 79,* 516–524. doi:10.1111/j.1746-1561.2009.00443.x

Williams, E., Persaud, G., & Turner, T. (2008). Planning for principal evaluation: Effects on school climate and achievement. *Educational Planning*, *17*(3).*

Williams, M. D. (2009). *The relationship of principal leadership behaviors with school climate, teacher job satisfaction, and student achievement* (Order No. 3367212). Available from ProQuest Dissertations and Theses Global. (305001472). Retrieved from http://search.proquest.com/docview/305001472?accountid=16716

Young, L. S. (1992). *The relationship between elementary school climate and student achievement in mathematics* (Order No. 9218135). Available from ProQuest Dissertations and Theses Global. (304021533). Retrieved from http://search.proquest.com/docview/304021533?accountid=16716*

Chapter 13
The Effect of Collective Teacher Efficacy on Student Achievement

Nazım Çoğaltay and Engin Karadağ

13.1 Introduction

The self-efficacy concept was firstly mentioned in the studies of Rotter (1966) and Bandura (1977) in the context of social cognitive theory. According to social cognitive theory, human behaviors are shaped under the influence of internal factors, such as beliefs, emotions and expectations, and the self-efficacy belief is one of these factors (Bandura 1977). In this regards, a teacher's self-efficacy is a concept reflecting his or her beliefs regarding his or her competence and whether (s)he can effectively facilitate the learning of students (Bandura 1997; Tschannen-Moran et al. 1998; Tschannen-Moran and Barr 2004). Teacher self-efficacy can be defined as a variable that influences educational activities, revealing professional differences among teachers (Gibson and Dembo 1984). The self-efficacy perceptions of teachers are linked to four sources (Tschannen-Moran et al. 1998): *i*) Mastery Experiences: This factor is related to how skills and behaviors that were previously learned affect educational situations. Since teachers can see their strengths and weaknesses only through practice, mastery experience is an important source of self-efficacy. *ii*) Emotional and Physiological Cues: Teachers' behaviors are closely related to how they feel spiritually and physically. The physiological responses of the people (increase in heart rate, sweating palms, shallow breathing and chills) in the face of a situation give clues of their beliefs about their own capacity. Teachers will be more successful when they learn how to give more consistent responses when faced with stressful situations or how to reduce their anxiety levels. For this reason, having different working experiences and facing various professional

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situations before entering the teaching profession may increase the future self-efficacy beliefs of teacher candidates. *iii*) Vicarious Experiences: Teacher candidates start to build their mastery through pre-service experiences (internship, in-service training) and by observing professional practices. These observations provide an indirect experience to the individual and assist to the formation of educator identity. *iv*) Social Persuasion: The encouragement, advice, or counsel that individuals receive about their achievements (whether they will be able to achieve success or not) affect their self-efficacy beliefs. In this regard, the feed-back received from managers, inspectors and peers and the encouragement and support from school may enhance teachers' self-efficacy.

Teacher self-efficacy is the subject of studies for many years and there were many attempts to examine its relations with other school-related variables. In addition, the literature, apart from showing that self-efficacy belief is an important variable, it also highlighted that self-efficacy beliefs determine the attitude and behaviors of the teachers in the classroom (Bandura 1997; Dembo and Gibson 1985; Riggs and Enochs 1990; Ross 1992; Tschannen-Moran and Hoy 2001; Wolfolk and Hoy 1990). Researche has showed that teachers with high self-efficacy perceptions are more motivated and diligent in their work, they work in an organized manner, they are more successful in interpersonal relations, they spend more time with their students, they help students with learning difficulties more and they make a better contribution to students' achievement (Gibson and Dembo 1984; Tschannen-Moran et al. 1998; Tschannen-Moran and Barr 2004).

Collective efficacy is a concept founded by Bandura (1993, 1997) interpreting self-efficacy on a group basis. Collective efficacy is the joint belief regarding the sum of the abilities of a group for organizing and executing the action plans required to achieve certain gains (Bandura 1997). This type of efficacy appears at group level, it reflects the belief of the group about its own power that allows the realization of common goals and it is a predictor of group performance (Bandura 1993, 1997). Collective teacher efficacy is a characteristic belonging to the whole school and it is part of the school culture (Schechter and Tschannen-Moran 2006). According to Bandura (1997), academic improvement is not only related to the sum of individual contributions but it can also be achieved through factors such as the collaborative work of teachers and their beliefs about the school's ability to achieve success. The literature has showed that there is a strong relationship between collective teacher efficacy and student achievement (Alinder 1994; Bandura 1993; Goddard 2001; Tschannen-Moran and Barr 2004). This raises the question of whether collective teacher efficacy plays a role in shaping in-school activities, such as class management, student motivation and teaching methods.

In this study, the effect of collective teacher efficacy on student achievement was investigated. In addition, the factors that are thought to affect the average effect size obtained in the study were set as moderators. These are the following: (*i*) the publication year of the research, (*ii*) the publication type of the research, (*iii*) the scale used to measure collective teacher efficacy and (*iv*) the level of education. All these variables, along with the results of previous research results, were used to test the following hypotheses of this study:

H_1 Collective teacher efficacy has a positive effect on student achievement.
H_2 Publication type is a moderator for the positive effect of collective teacher efficacy on student achievement.
H_3 School level is a moderator for the positive effect of collective teacher efficacy on student achievement.
H_4 The tool of data collection is a moderator for the positive effect of collective teacher efficacy on student achievement.
H_5 The year of the studies is a moderator for the positive effect of collective teacher efficacy on student achievement.

13.2 Method

13.2.1 Study Design

In this study, the effect of collective teacher efficacy on student achievement was tested with a meta-analysis design.

13.2.2 Review Strategy and Criteria for Inclusion/Exclusion

To determine the research studies to include in the meta-analysis, the Science-Direct, Proquest and Ebsco academic databases were used to conduct a literature review. For this process, the terms collective teacher efficacy and student achievement/student success included in the titles of the studies were used to screen the research studies. The end date for the research studies included in the research was identified as January 2016. Doctoral dissertations and peer-reviewed journals were included in the study.

Many strategies were used to identify the research studies that were appropriate for the meta-analysis of the study. First, a research study pool (48 research studies) was established; it included all studies with collective teacher efficacy and student achievement/success in their titles. The abstracts of these studies were reviewed, and all were found to be appropriate to include in the study. In the second stage, all research studies in the pool were examined in detail. The results of the examination found that 35 of the research studies in the pool were appropriate, and 13 were not found to be suitable. The descriptive statistics of the 35 research studies included in the analysis are presented in Table 13.1.

Table 13.1 Characteristics of the studies included in the meta-analysis

Options	1	2	3	Total
Type of publication	Thesis	Article		–
	24	11		35
	65.57	34.43		100
The years of the studies	2000–2015	2006–2011	2011–2016	
	9	16	10	35
	25.71	45.71	28.57	100

The criteria for inclusion of the research studies in the analysis study were identified as follows:

- To have the statistical information necessary for correlational meta-analysis (n and r, or R^2 values)
- To be a study measuring the correlation school culture and student achievement/success

Reasons for not including a research study in the meta-analysis:

- Having no quantitative data (qualitative research)
- Not having a correlation coefficient
- Not focusing on student achievement
- Not focusing on collective teacher efficacy

13.2.3 Coding Process

The coding process was essentially a data sorting process used to ascertain which data were clear and suitable for the study. In this scope, a coding form was developed before the statistical analysis was conducted, and the coding was conducted according to the form. The main aim was to develop a specific coding system that allowed the study to see the entirety of the research studies in general and that would not miss any characteristics of each individual research study. The coding form developed in the study was comprised of:

- References for the research
- Sample information
- Sample group
- Type of publication,
- The years of the studies
- Data collection tool(s)
- Quantitative values

13.2.4 Statistical Processes

The effect size acquired in meta-analysis is a standard measure value used in the determination of the strength and direction of the relationship in the study (Borenstein et al. 2009). Pearson's correlation coefficient (r) was determined to be the effect size in this study. Because the correlation coefficient has a value between $+1$ and -1, the r value calculated was evaluated by converting this value into the value as it appears in the z table (Hedges and Olkin 1985). Provided that more than one correlation value is given between the same structure categories in correlational meta-analysis studies, two different approaches are used in the determination of the one to be used in the meta-analysis (Borenstein et al. 2009; Kulinskaya et al. 2008). For this study, (*i*) first, if the correlations were independent, all the related correlations were included in the analysis and were considered to be independent studies, and (*ii*) if there were dependent correlations, then the *average correlation value* was accepted. Accordingly, for each study, a mean correlation was determined by finding the average of all reported correlations between CTE and achievement (reading, math, writing, social studies). For example, if one researcher measured math, reading, and writing achievement for third, fourth, and fifth grades, so for each subject area, the average of the three correlations for CTE and achievement was reported as one correlation. A *random effect model* was used for the meta-analysis processes in this study. The *Comprehensive Meta-Analysis* program was used in the meta-analysis process.

13.2.5 Moderator Variables

To determine the statistical significance of the differences between the moderators of the study, only the Q_b values were used. Four moderator variables that were expected to have a role in the average effect size were identified in the study. The first of these considered is the *type of publication* as a moderator in regards to the relationship between collective teacher efficacy and student achievement. The second is the *tools of data collection* which was thought to have a role on the average impact of school culture on student achievement. The rest are the *school level, and* years *of the studies*.

13.2.6 Publication Bias

A funnel plot for the research studies included in the meta-analysis of can be seen in Fig. 13.1. Evidence that publication bias affected the research studies included in the meta-analysis can be seen in Fig. 13.1. A serious asymmetry would be expected in the funnel plot if there were a publication bias. The concentration of plots on one

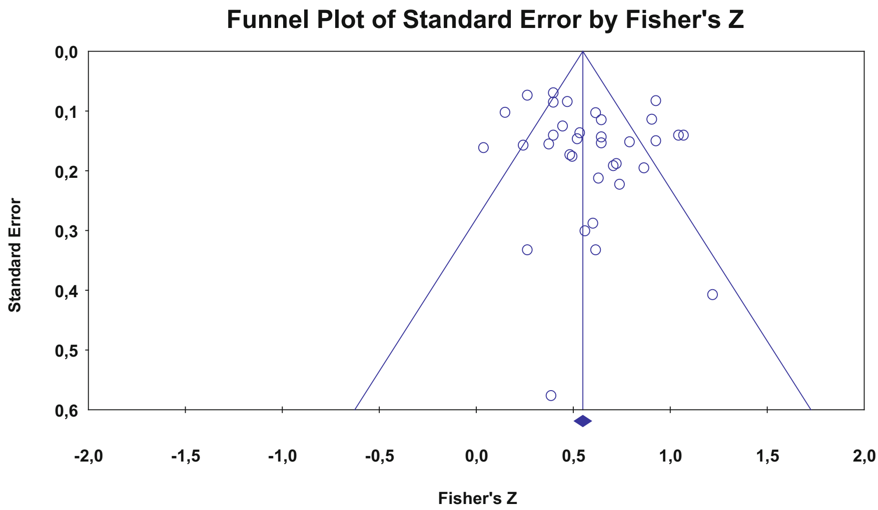

Fig. 13.1 Effect size funnel for publication bias

Table 13.2 Duval and Tweedie's trim and fill test results

	Excluded studies	Point estimate	CI (confidence interval)		*Q*
			Lower limit	Upper limit	
Observed values		.52*	.45	.59	130.34
Corrected values	0	.52*	.45	.59	130.34

side under the line of average effect size, particularly in the bottom section of the funnel, suggests the probability of a publication bias in the research studies. In this study, no evidence of partiality of the publications was observed in any of the 35 data subjected to meta-analysis.

Although no partiality in publications was observed in the funnel plot, the results of Duval and Tweedie's trim and fill test, which was applied to determine the effect of partiality in publications acquired with the meta-analysis using the random effect model, are given in Table 13.2. As is seen in Table 13.2, there is no difference between the effect observed and the artificial effect size created to fix the effect of the partiality of publications. The research on each side of the center line is symmetrical, and this is the indicator of non-difference. Because there is no evidence indicating lost data on either side of the center line, the difference between the fixed effect size and observed effect size is zero.

13.3 Findings

Table 13.3 presents the results of the meta-analysis regarding the relationship between collective teacher efficacy and student achievement. The findings support hypothesis H_1 which states that there is a positive relationship between collective teacher efficacy and student achievement. The effect size of collective teacher efficacy on student achievement is calculated as .52. This value shows that teacher efficacy has a high level of effect on student achievement (see Cohen 1988). In addition, Table 13.3 presents the meta-analysis results regarding the effect size of teacher efficacy in different courses. Accordingly, the level of effect of collective teacher efficacy on student achievement is calculated as .54, .61, .61 and .50 for mathematics, reading, writing and English courses respectively. The effect sizes are at a high level in all the courses examined.

Findings did not support hypotheses H_2, H_3, H_4 and H_5 regarding the variables of education level, publication year, publication type and scale type (tool of data collections) which were hypothesized to be moderators in the relationship between

Table 13.3 Findings of the correlations between collective teacher efficacy and student achievement: results of meta-analysis

Variables	*k*	*N*	*r*	CI (confidence interval)		*Q*	Q_b
				Lower limit	Upper limit		
Average	35	2087	.52*	.45	.59	130.34*	
Math	25	1285	.54*	.45	.61	88.62*	
Reading	18	833	.61*	.53	.68	40.91*	
Writing	10	438	.61*	.50	.70	20.91**	
English	7	290	.50*	.34	.63	14.25**	
Moderator [publication type]							0.1
Article	11	982	.52*	.39	.62		
Dissertation	24	1105	.52*	.43	.60		
Moderator [year of publication]							
2000–2005	9	641	.55*	.42	.66		1.39
2006–2010	16	860	.54*	.44	.63		
2011–2016	10	586	.45*	.31	.58		
Moderator [scale]							
CE-Long	8	349	.50*	.32	.65		1.09
CE-Short	20	1288	.55*	.46	.63		
Other	7	450	.46*	.28	.60		
Moderator [level of education]							
Elementary	19	1120	.50*	.40	.60		1.55
High	10	468	.59*	.45	.70		
Middle	2	115	.44*	.10	.70		
Other	4	384	49*	.27	.66		

$^*p < .01$, $^{**}p < .05$

collective teacher efficacy and student achievement. The moderator analysis showed that there are no statistically significant differences in the effect sizes of the publication years examined (Q_b = 0.1, p > .05), of the two publication types (Q_b = 1.39, p > .05), of the various scale types (Q_b = 1.09, p > .05) and of the different educational levels (Q_b = 1.55, p > .05).

13.4 Conclusion

The findings obtained in this meta-analysis showed that collective teacher efficacy has a high level positive effect on student achievement. The findings showed that the joint competency belief level of the teachers working in the same school is a good predictor of this school's student achievement. Collective teacher efficacy, which describes the joint beliefs of the teachers working in the same school about the sum of their competencies for planning and executing educational activities to achieve certain goals (Bandura 1993, 1997; Gibson and Dembo 1984; Tschannen-Moran et al. 1998), affects teachers' attitude and behaviors towards the training of students, the management of classes and students' motivation (Goddard et al. 2000). Teachers from schools with higher belief levels set more challenging and long-term goals, they are not easily discouraged and they make more efforts, they do not avoid responsibilities and they do not consider demographic variables, such as socio-economic status or race, as reasons of failure (Acun 2014; Alinder 1994; Goddard 2001; Bandura 1993; Schechter and Tschannen-Moran 2006; Tschannen-Moran and Barr 2004). They believe that they can carry student achievement to a higher level through these attitudes and behaviors in school. The findings of our study support the literature's theoretical suggestions about collective teacher efficacy. According to the findings of the meta-analysis, the previously mentioned effect is high for all disciplines (such as reading, writing and maths), which shows that collective teacher efficacy is strongly associated with academic achievement. The role of teachers is crucial in enhancing student achievement, and it is possible to say that collective teacher efficacy beliefs in the school shape and influence student achievement to a large extent. It should be kept in mind, however, that according to social cognitive theory it is not only the beliefs that affect the behaviors and the environment but also the vice versa. This study analyzes the effect of collective teacher efficacy, which in some way arises within the school, on academic achievement but it does not show how this belief about teacher efficacy has emerged. Such a question can only be answered through qualitative studies that will be conducted in the schools having or lacking strong collective efficacy beliefs.

The result of the analysis performed in terms of publication year, publication type, scale and education level, which were thought to be moderator in the relationship between collective teacher efficacy and student achievement, did not show any moderator effect of these variables. The effect size of these variables is also positive and high. This finding shows that collective teacher efficacy researches reported similar effects, even though they have used different scales, they have been conducted in different years and at different education levels. In the light of the meta-analysis findings, the following suggestions were submitted:

- The schools who want to improve student achievement should determine collective efficacy perception level of their teachers. Considering that this level is an important predictor of student achievement, all schools should make efforts the increase this efficacy level.
- Since quantitative studies measure only the level of collective teacher efficacy in school, qualitative studies should be conducted to determine descriptive and predictive variables of this efficacy belief.
- The majority of the researches included in the meta-analysis were conducted in the schools of USA, which has not allowed to make an analysis in terms of culture variable. Considering this fact, studies revealing the relationship between collective teacher efficacy and student achievement should be conducted in different countries.
- Similar meta-analysis study, examining the relations of collective teacher efficacy with other school variables (culture, climate, loyalty, school leadership, etc.) should be conducted.

References

Note. "*" References marked with an asterisk indicate studies included in the meta–analysis. The in–text citations to studies selected for meta–analysis are not followed by asterisks.

Acun, İ. (2014). Web-supported effective human rights, democracy and citizenship education? *Computers & Education, 70,* 21–28.

Adams, C. M., & Forsyth, P. B. (2006). Proximate sources of collective teacher efficacy. *Journal of Educational Administration, 44*(6), 625–642.*

Allinder, R. M. (1994). The relationship between efficacy and the instructional practices of special education teachers and consultants. *Teacher Education and Special Education: The Journal of the Teacher Education Division of the Council for Exceptional Children, 17*(2), 86–95.

Antonelli, L. A. (2005). *Organizational and SES predictors of student achievement and school effectiveness.* Unpublished doctoral dissertation, ST. John's University, New York.*

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*(2), 191–215.

Bandura, A. (1993). Perceived self-efficacy in cognitive development and functioning. *Educational Psychologist, 28*(2), 117–148.

Bandura, A. (1997). *Self-efficacy: The exercise of control.* New York: W.H. Freeman and Company.

Barr, M. F. (2002). *Fostering student achievement: A study of the relationship of collective teacher efficacy and student achievement.* Unpublished doctoral dissertation, The College of William and Mary, Virginia.*

Belfi, B., Gielen, S., Fraine, B. D., Verchueren, K., & Meredith, C. (2015). School-based social capital: The missing link between schools' socioeconomic composition and collective teacher efficacy. *Teaching and Teacher education, 45,* 33–44.*

Bevel, R. K. (2010). *The effects of academic optimism on student academic achievement in Alabama.* Unpublished doctoral dissertation, The University of Alabama, Alabama.*

Borenstein, M., Hedges, L. V., Higgins, J. P. T., & Rothstein, H. R. (2009). *Introduction to meta-analysis*. Chichester: Wiley.

Bozman, C. E. (2011*). The effects of principals' leadership styles, teacher efficacy, and teachers' trust in their principals on student achievement*. Unpublished doctoral dissertation, Tennessee State University, Tennessee.*

Burcham, M. W. (2009). *The impact of collective teacher efficacy on student achievement in high school science.* Unpublished doctoral dissertation, Gardner-Webb University, North Carolina.*

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Hillside, NJ: Lawrence Erlbaum.

Cooper, J. (2010). *Collective efficacy, organizational citizenship behavior, and school effectiveness in Alabama public high schools*. Unpublished doctoral dissertation, University of Alabama, Alabama.*

Cybulski, T. G. (2003). *Investigating the role of the collective efficacy of teachers in fiscal efficiency and student achievement*. Unpublished doctoral dissertation, *Ohio State* University, Ohio.*

Çalık, M., Sezgin, F., Kavgacı, H., & Kılınç, E. (2012). Examination of relationships between instructional leadership of school principals and self-efficacy of teachers and collective teacher efficacy. *Educational Sciences: Theory & Practice, 12*(4), 2498–2504.

Dembo, M. H., & Gibson, S. (1985). Teachers' sense of efficacy: An important factor in school improvement. *The Elementary School Journal*, 173–184.

Duval, S., & Tweedie, R. (2000). Trim and fill: A simple funnel-plot-based method of testing and adjusting for publication bias in meta-analysis. *Biometrics, 56,* 455–463.

Eells, R. J. (2011). *Meta-Analysis of the relationship between collective teacher efficacy and student achivement*. Unpublished doctoral dissertation, Loyola University: Chicago.

Erdoğan, U., & Dönmez, B. (2015). Kolektif öğretmen yeterliği ölçeğinin türkçeye uyarlanması: geçerlik & güvenirlik çalışması. *Kuram & Uygulamada Eğitim Yönetimi, 21*(3), 345–366.

Fancera, S. (2009). *Instructional leadership influence on collective efficacy and school achievement.* Unpublished doctoral dissertation, The State University of New Jersey, New Jersey.*

Fancera, S. F., Bliss, J. R. (2011). Instructional leadership influence on collective teacher efficacy to improve school achievement. *Leadership and Policy in Schools, 10*:349–370.*

Garcia, H. (2004). *The impact of collective efficacy on student achievement: Implications for building a learning community.* Unpublished doctoral dissertation, Loyola University, Chicago.*

Gibson, S., & Dembo, M. H. (1984). Teacher efficacy: A construct validation. *Journal of Educational Psychology, 76*(4), 569–582.

Goddard, R. D. (2001). Collective efficacy: A neglected construct in the study of schools and student achievement. *Journal of Educational Psychology, 93*(3), 467–476.

Goddard, R. D., & Goddard, Y. L. (2001). A multilevel analysis of the relationship between teacher and collective efficacy in urban schools. *Teaching and Teacher Education, 17*(7), 807–18.*

Goddard, R. D., Hoy, W. K., & Woolfolk Hoy, A. (2000). Collective teacher efficacy: Its meaning, measure, and impact on student achievement. *American Educational Research Journal, 37*(2), 479–507.

Goddard, R. D., Logerfo, L., & Hoy, W. K. (2004). High school accountability: the role of perceived collective efficacy. *Educational Policy, 18*(3), 403–425.*

Hedges, L. V., & Olkin, I. (1985). *Statistical method for meta-analysis*. London: Academic.

Jackson, J. (2009). *Organizational citizenship behaviors, collective teacher efficacy, and student achievement in elementary schools.* Unpublished doctoral dissertation, The College of William and Mary, Virginia.*

Kulinskaya, E., Morgenthaler, S., & Staudte, R. G. (2008). *Meta analysis: A guide to calibrating and combining statistical evidence*. Chichester: Wiley.

McClain, J. (2013). *The relationship between collective efficacy and student achievement.* Unpublished doctoral dissertation, University of Virginia, Virginia.*

McCoach, D. B., Colbert, R. D. (2010). Factors underlying the collective teacher efficacy scale and their mediating role in the effect of socioeconomic status on academic achievement at the school level. *Measurement and Evaluation in Counseling and Development, 43*(1), 31–47.*

Moolenaar, N. M., Sleegers, P. J. C., & Daly, A. J. (2012). Teaming up: Linking collaboration networks, collective efficacy and student achievement. *Teaching and Teacher education, 28,* 251–262.*

Nicholson, M. R. (2003). *Transformational leadership and collective efficacy: A model of school achievement.* Unpublished doctoral dissertation, The Ohio State University, Ohio.*

Omolade, R. (2007). *A systems test of effectiveness of elementary schools in Nigeria.* Unpublished doctoral dissertation, ST. John's University, New York.*

Parker, L. E. (1994). Working together: Perceived self- and collective-efficacy at the workplace. *Journal of Applied Social Psychology, 24*(1), 43–59.

Parker, K., Hannah, E., & Topping, K. (2006). Collective teacher efficacy, pupil attainment and socio-economic status in primary school. *Improving Schools, 9*(2), 111–129.*

Paz, D. F. (2013). *A comparative analysis of collective efficacy measurement and the effects collective efficacy beliefs have on student achievement in select texas suburban elementary schools.* Unpublished doctoral dissertation, Texas A&M University, Texas.*

Pearce, S. (2007). *Mitigating the effects of poverty: A study of collective teacher efficacy, socioeconomic status, and student achievement in Colorado elementary schools.* Unpublished doctoral dissertation, University of Colorado, Colorado.*

Reddick, K. M. (2014). *Investigating the relationships among leadership influence, collective teacher efficacy, and socio-economic status as predictors of student achievement.* Unpublished doctoral dissertation, Capella University, Minnesota.*

Riggs, I. M., & Enochs, L. G. (1990). Toward the development of an elementary teacher's science teaching efficacy belief instrument. *Science Education, 74*(6), 625–637.

Ross, J. A. (1992). Teacher efficacy and the effect of coaching on student achievement. *Canadian Journal of Education, 17*(1), 51–65.

Ross, J. A., & Gray, P. (2006). School leadership and student achievement: The mediating effects of teacher beliefs. *Canadian Journal of Education, 29*(3), 798–822.*

Ross, J. A., Hogaboam-Gray, A., & Gray, P. (2004). Prior student achievement, collaborative school processes, and collective teacher efficacy. *Leadership and Policy in Schools, 3*(3), 163–188.*

Rotter, J. B. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs, 80,* 1–28.

Schechter, C., & Tschannen-Moran, M. (2006). Teachers sense of collective efficacy: An international view. *International Journal of Educational Management, 20*(6), 480–489.

Schumacher, D. (2009). *Collective teacher efficacy and student achievement*. Unpublished doctoral dissertation, Western Illinois University, Illinois.*

Shepard, S. H. (2005). *The relationship between the effective schools characteristics, collective teacher efficacy, and student achievement in high poverty, high minority populated elementary schools in Mississippi.* Unpublished doctoral dissertation, The University of Mississippi, Mississippi.*

Sheu, M. H. C. (2012). *Influences of collective teacher efficacy on urban public high school student achievement.* Unpublished doctoral dissertation, California State University, Los Angeles.*

Sidhu, D. K. (2006). *Applying the principles of Albert Bandura's social cognitive theory to examine if collective teacher efficacy contributes to higher student achievement through the processes established under the model of a learning organization.* Unpublished doctoral dissertation, Alliant International University, Alhambra.*

Salloum, S. J. (2011*). Collective efficacy, social context, teachers' work, and student achievement: A mixed-method study.* Unpublished doctoral dissertation, The University of Michigan, Michigan.*

Solomon, C. (2007). *The relationships among middle level leadership, teacher commitment, teacher collective efficacy, and student achievement.* Unpublished doctoral dissertation, University of Missouri, Columbia.*

Tschannen-Moran, M., Woolfolk Hoy, A., & Hoy, W. K. (1998). Teacher efficacy: Its meaning and measure. *Review of Educational Research, 68*(2), 202–248.

Tschannen-Moran, M., & Woolfolk Hoy, A. (2001). Teacher efficacy: Capturing an elusive construct. *Teaching and Teacher Education, 17,* 783–805.

Tschannen-Moran, M., & Barr, M. (2004). Fostering student learning: The relationship of collective teacher efficacy and student achievement. *Leadership and Policy in Schools, 3*(3), 189–209.*

Turhan, M., & Yaraş, Z. (2014). İlkokul yöneticilerinin program liderliği davranışlarını gösterme düzeylerinin öğretmenlerin kolektif yeterlik algısına & örgütsel öğrenme düzeyine etkisi. *Eğitim Bilimleri Dergisi, 39,* 175–193.

Wagner, C. (2008). *Academic optimism of Virginia high school teachers: Its relationship to organizational citizenship behaviors and student achievement.* Unpublished doctoral dissertation, The College of William and Mary, Virginia.*

Washburn, T. E. (2006). *Teacher's collective efficacy beliefs and student achievement in Virginia elementary schools.* Unpublished doctoral dissertation, University of Virginia, Virginia.*

Woolfolk, A. E., & Hoy, W. K. (1990). Prospective teachers' sense of efficacy and beliefs about control. *Journal of Educational Psychology, 82*(1), 81–91.

Chapter 14
The Effect of Expectation on Student Achievement

Şahin Danişman

14.1 Introduction

The school environment is a community in which human interaction which included people's beliefs, perceptions and expectations takes place. The members of schools, which include the administrators, teachers and students, have a set of common goals, values, desires or norms regarding achievement, and this set can be called 'academic press' (Shouse 1996). It is argued that academic press includes all these affective elements as well as school practices, policies, norms and expectations (Lee Smith et al. 1999). Lee et al. (1999) see teachers' expectations as one of the most important school factors which can influence students' academic achievement. Within the academic press, teachers and administrators have high expectations for the achievement of students (Lee and Smith 1996). This chapter focuses on the expectation dimension of academic press, enlarging it to include the expectations of teachers, parents and students. These affective constructs have an effect on individuals in that individuals adjust their behaviors, either consciously or not, to match the stereotypical images originating from other people's expectations (Al-Fadhli and Singh 2006). Expectations are defined as the estimation of the potentiality of attaining a goal (Wilson and Wilson 1992).

Drawing attention to the threat of low expectations, Lee and Smith (1999) assert that the level of teachers' expectations is "a brick" for the academic goals of schools and students. Apart from positive expectations, there is also the self-fulfilling prophecy phenomenon which is also called as the Pygmalion effect and is related to the behavioral confirmation of false beliefs (Merton 1948). The self-fulfilling prophecy occurs in three connected events (Darley and Fazio 1980; Jones 1986; Jussim 1986). Firstly, the perceiver holds a false belief about a target. Secondly, the perceiver treats the target in a way matching the false belief. Thirdly, the target

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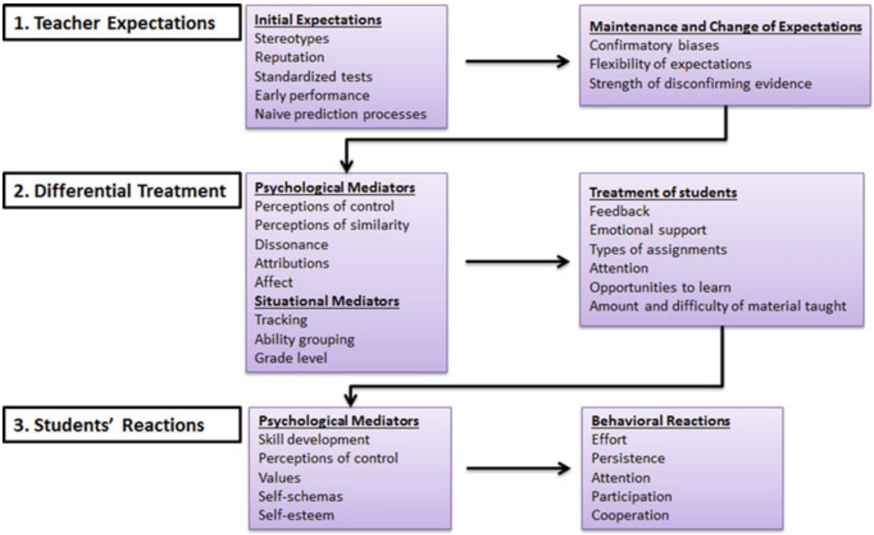

Fig. 14.1 Self-fulfilling prophecies

responds to this treatment in a way that validates the false belief. Self-fulfilling prophesies is a common phenomenon in education settings, and they are a major area of research for educational psychologists. Jussim (1986) lists three sequential stages in an educational environment as follows: (*i*) teachers develop expectations, (*ii*) teachers treat students differently depending on their expectations and (*iii*) students react to this treatment in expectancy-confirming ways (see Fig. 14.1).

A research by Rosenthal and Jacobson (1968) hypothesized and verified that some students may perform more poorly at schools than their peers as a result of their teachers' low expectations about them. Similarly, Parsley and Corcoran (2003) concluded that teachers' behaviors might affect the self-perceptions of students who might see themselves as potential achievers or the other way around as "at-risk failures." Additional studies in the literature support the argument that teachers' expectations may have a major influence on student achievement (Alvidrez and Weinstein 1999; Good and Brophy 2000; Kuklinski and Weinstein 2000; Madon et al. 1997; Weinstein and McKown 1998).

Another dimension of expectations is related to parents. Parental expectations are various beliefs, assumptions and aspirations regarding students' relationship with the factors that contribute to children's achievement, such as faculty or curriculum (Adeniji-Neill 2008). Parental expectations is arguably an important predictor of student achievement (Aldous 2006; Davis-Kean 2005; Jeynes 2007; Patrikakou 1997; Wu and Qi 2006), since the beliefs of parents motivate them to support their children towards achievement (Carden 2005). Furthermore, parental expectations about their children attending a university may be more influential for students than teachers' expectations (Ma 2001). There are a number of parameters affecting parents' expectations about their children such as societal factors (Hill 2001; Weeks 2008), the education level (Seyfried and Chung 2003; Wood et al. 2010), income (Diamond and Gomez 2004; Grinstein-Weiss et al. 2009; Wood et al. 2010), the child's gender (Hill 2001; Graves 2010; Wood et al. 2010), and the achievement of the child (Englund 2004). Parental expectations are different from parental involvement in that they refer to parents' beliefs while parental involvement focuses on the actual behaviors (Englund et al. 2004).

The third dimension of expectations belongs to the students themselves. Self-expectations and beliefs of students are likely to be based on their prior achievements and experience and on the aspirations of parents and teachers (Rubie-Davies et al. 2010). Students' self-expectations may be twofold including their expectations about the level of education that they will attain (Eccles 1983) and their expectations about the grades they will get in specific courses (Maskey 2012). The literature on students' academic expectations has argued that these expectations influence students' achievement levels (Lucio et al. 2011; Sanders et al. 2001). Furthermore, parental expectations may have an effect on students' academic expectations (Patrikakou 1997). Accordingly, the expectancy-value theory of achievement motivation developed by Wigfield and Eccles (2002) asserts that students' expectations are influenced by students' social context, such as, for example, parents, teachers, peers, neighborhood or community and earlier academic achievement. This theory also suggests that there are causal relationships between social context and students' self-expectations on the one hand and academic achievement on the other hand (Zhang et al. 2011). Similarly, many studies in the literature suggest the existence of a reciprocal relationship between students' achievement and expectations (Bui 2007; Eccles and Wigfield 2002; Sanders et al. 2001).

As it can be seen from the above, while teachers clearly hold expectations for students, students will have self-expectations too and parents will also have certain expectations for their children (Rubie-Davies et al. 2010). The examination of the expectations held by teachers, parents and students suggests that academic achievement is significantly influenced by these expectations. Taking into account the fact that there are a number of studies on the relationship between expectation and student achievement, this study aimed to test the following hypotheses bringing together the results of previous research:

H_1 Expectation has a positive effect on student achievement.
H_2 Publication type is a moderator for the positive effect of expectation on student achievement.
H_3 Sample group is a moderator for the positive effect of expectation on student achievement.
H_4 School subject or assessment type is a moderator for the positive effect of expectation on student achievement.
H_5 Country is a moderator for the positive effect of expectation on student achievement.

H_6 The year of the studies is a moderator for the positive effect of expectation on student achievement.
H_7 Source of expectation is a moderator for the positive effect of expectation on student achievement.

14.2 Method

14.2.1 Study Design

In this study, the effect of expectation on student achievement was tested with a meta-analysis design.

14.2.2 Review Strategy and Criteria for Inclusion/Exclusion

To determine the research studies to include in the meta-analysis, the Science-Direct, Proquest and Ebsco academic databases were used to conduct a literature review. For this process, the terms *expectation/expectancy* and *achievement/success* included in the titles of the studies were used to screen the research studies. The start and end dates for the research studies included in the research were identified as 2005 and February 2016. Doctoral dissertations and peer-reviewed journals were included in the study.

Many strategies were used to identify the research studies that were appropriate for the meta-analysis of the study. First, a research study pool (1641 research studies) was established; it included all studies with expectation/expectancy and student achievement/success in their titles. The abstracts of these studies were reviewed, and all were found to be appropriate to include in the study. In the second stage, all research studies in the pool were examined in detail. The results of the examination found that 67 research studies yielding 126 correlation coefficients were appropriate, and 1574 were not found to be suitable. The descriptive statistics of the 126 correlation coefficients obtained from 67 studies included in the analysis are presented in Table 14.1.

The criteria for inclusion of the research studies in the analysis study were identified as follows:

- To have the statistical information necessary for correlational meta-analysis (n and r, or R^2 values)
- To be a study measuring the correlation between expectation and student achievement/success

Reasons for not including a research study in the meta-analysis:

Table 14.1 Characteristics of the studies included in the meta-analysis

Variables		1	2	3	4	5	6	Total
Type of publication		Article	Thesis/dissertation					–
	n	64	62					126
	%	51	49					100
Sample group/unit		Preschool	Elementary school	Middle school	High school	University	Mixed	
	n	3	28	25	23	21	26	126
	%	2	22	20	18	17	21	100
School subject/assessment type		Language	Mathematics	Other	Mixed			
	n	39	34	14	39			126
	%	31	27	11	31			100
Country		Vertical-collectivist	Horizontal-individualist					
	n	16	110					126
	%	13	87					100
Publication year		2005–2008	2009–2012	2013–2016				
	n	32	46	48				126
	%	25	37	38				100
Source of expectation		Student	Parent	Teacher	Mixed			
	n	55	42	28	1			126
	%	44	33	22	1			100

- Having no quantitative data (qualitative research)
- Not having a correlation coefficient
- Not focusing on student achievement
- Not focusing on expectation.

14.2.3 Coding Process

The coding process was essentially a data sorting process used to ascertain which data were clear and suitable for the study. In this scope, a coding form was developed before the statistical analysis was conducted, and the coding was conducted according to the form. The main aim was to develop a specific coding system that allowed the study to see the entirety of the research studies in general and that would not miss any characteristics of each individual research study. The coding form developed in the study was comprised of:

- References for the research,
- Sample information,
- Type of publication,
- Sample group,
- School subject or assessment type,
- Country,
- The years of the studies,
- Source of expectation,
- Data collection tool(s),
- Quantitative values.

14.2.4 Statistical Processes

The effect size acquired in meta-analysis is a standard measure value used in the determination of the strength and direction of the relationship in the study (Borenstein et al. 2009). Pearson's correlation coefficient (r) was determined to be the effect size in this study. Because the correlation coefficient has a value between $+1$ and -1, the r value calculated was evaluated by converting this value into the value as it appears in the z table (Hedges and Olkin 1985). Provided that more than one correlation value is given between the same structure categories in correlational meta-analysis studies, two different approaches are used in the determination of the one to be used in the meta-analysis (Borenstein et al. 2009; Kulinskaya et al. 2008). For this study, (*i*) first, if the Correlations were independent, all the related correlations were included in the analysis and were considered to be independent studies, and (*ii*) if there were dependent correlations, then the *highest correlation value* was accepted. A *random effect model* was used for the meta-analysis processes in this study. The *Comprehensive Meta-Analysis* program was used in the meta-analysis process.

14.2.5 Moderator Variables

To determine the statistical significance of the differences between the moderators of the study, only the Q_b values were used. Six moderator variables that were expected to have a role in the average effect size were identified in the study. The first of these considered is the *type of publication* as a moderator in regards to the relationship between expectation and student achievement. The second is the *sample group* which was thought to have a role on the average impact of expectation on student achievement. The rest are the *school subject/assessment type, country*, *years of the studies*, and *source of expectation.*

14.2.6 Publication Bias

A funnel plot for the research studies included in the meta-analysis of can be seen in Fig. 14.2. Evidence that publication bias affected the research studies included in the meta-analysis can be seen in Fig. 14.2. A serious asymmetry would be expected in the funnel plot if there were a publication bias. The concentration of plots on one side under the line of average effect size, particularly in the bottom section of the funnel, suggests the probability of a publication bias in the research studies.

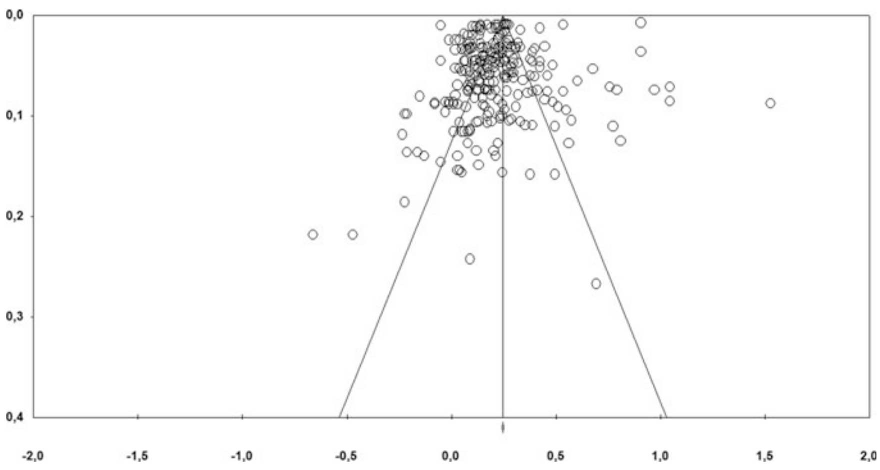

Fig. 14.2 Effect size funnel for publication bias

Table 14.2 Duval and Tweedie's trim and fill test results

	Excluded studies	Point estimate	CI (confidence interval)		*Q*
			Lower limit	Upper limit	
Observed values		.32	.28	.35	4240.66244
Adjusted values	1	.32	.28	.35	4243.90285

Evidence for publication bias was observed for the 126 data included in the meta-analysis study.

A publication bias was observed in the funnel plot, and the results of Duval and Tweedie's trim and fill test, which was applied to determine the effect size related to partiality in the publications that was acquired with the meta-analysis using the random effect model, are shown in. As seen in Table 14.2, there is a difference between the observed effect size and the virtual effect size established to correct the effect of the publication bias. The reason for the difference is the asymmetry of the concentration on both sides of the center line and the studies plotted to the left of and above the center line, skewing the symmetry.

14.3 Findings

Table 14.3 shows the results of the meta-analysis examining the relationship between student achievement and expectation. The findings supported hypothesis H_1 which states that there is a positive relationship between student achievement and expectation. The effect size of expectation on student achievement was calculated to be .32. This value shows that expectation has a medium level effect (*see* Cohen 1988) on student achievement.

The results of the moderator analysis confirmed hypothesis H_2 regarding the moderator role of publication type on the level of effect of expectation on student achievement. The moderator analysis conducted through a random effects model found that the level of effect of publication type on student achievement was significant (Q_b = 29.104, p < .05). Theses and dissertations have a low level of effect [r = .23], while articles have a medium level effect [r = .40] on student achievement. In other words, the effect from articles is higher than the effect from theses/dissertations.

The findings did not provide support for hypothesis H_3 which stated that the sample group plays a moderator role on the level of effect that expectation has on student achievement. Although the moderator analysis did not find a statistically significant difference between the levels of effect of the various sample groups (Q_b = 10.119, p > .05), the level of effect of expectation on student achievement is statistically significant and at a medium level for preschool, [r = .34], elementary school [r = .34], middle school [r = .34], high school [r = .34] and mixed group [r = .34], while it is significant and at a low level for university [r = .19].

Table 14.3 Findings regarding the relationship between student achievement and expectation: meta-analysis results

Variable	k	N	*r*	CI (confidence interval)		*Q*	Q_b
				Lower limit	Upper limit		
Expectation	126	104,926	.32*	.28	.35	**424.662***	
Moderator [Type of publication]							**29.104***
Thesis and dissertation	62	28,971	.23*	.18	.27		
Article	64	75,955	.40*	.36	.44		
Moderator [Sample group]							**10.119**
Preschool	3	494	.34*	.11	.54		
Elementary school	28	17,858	.34*	.27	.41		
Middle school	25	41,514	.34*	.27	.41		
High school	23	31,346	.34*	.26	.41		
University	21	6031	.19*	.09	.28		
Mixed	26	7683	.34*	.27	.41		
Moderator [School subject/assessment type]							**1.329**
Language	39	22,471	.34*	.28	.40		
Mathematics	34	28,361	.32*	.25	.38		
Other	14	7529	.31*	.20	.41		
Mixed	39	46,565	.29*	.23	.35		
Moderator [Country]							**5.832****
Vertical-collectivist	16	17,977	.43*	.33	.52		
Horizontal-individualist	110	86,949	.30*	.26	.34		
Moderator [Year of publication]							**2.970**
2005–2008	32	47,186	.36*	.29	.42		
2009–2012	46	17,103	.33*	.27	.38		
2013–2016	48	40,637	.28*	.23	.34		
Moderator [Source of expectation]							**19.933***
Student	55	64,932	.34*	.30	.39		
Parent	42	30,585	.23*	.17	.28		
Teacher	28	9275	.40*	.34	.46		
Mixed	1	134	.31	−.07	.61		

*p < .01, **p < .05

The moderator analysis also did not find support for hypothesis H_4 asserting that school subject is a moderator variable for the effect of expectation on student achievement. There is no statistically significant difference in the level of effect of the different school subjects (Q_b = 1.329, p > .05). The level of effect of expectation on student achievement is, however, statistically significant and at a medium level for language [r = .34], mathematics [r = .32], other subjects [r = .31] and general achievement [r = .29].

The findings supported hypothesis H_5 which formulated that country played a moderator role in the effect expectation has on student achievement. The moderator analysis showed that the difference between the level of effect of the countries examined was statistically significant (Q_b = 5.832, p < .05). In particular, it was found that both the vertical-collectivist [r = .43] and the horizontal-individualist [r = .30] countries had a low level effect on student achievement. The countries with the highest level of effect were found to be the vertical-collectivist ones.

This research did not find support for hypothesis H_6 which hypothesized that publication year plays a moderator role in the effect of expectation on student achievement. The moderator analysis did not reveal a statistically significant difference in the level of effect of the various publication years of the research studies examined (Q_b = 2.970, p > .05), suggesting that the strength of the relationship between expectations and achievement is similar over the years. On the other hand, it was found that publication year has a medium level effect on student achievement with regard to publications dated between 2005 and 2008 [r = .36], between 2009 and 2012 [r = .33] and between 2013 and 2016 [r = .28].

Concerning the sources of expectation, it has been found that the average weighted correlations for each source of expectation and achievement differed significantly (Q_b = 19.933, p < .05). Additionally, it was found that the effects of student [r = .34] and teacher [r = .40] expectations on achievement were significant and at a medium level, while the effect of parent [r = .23] expectations was significant and at a low level. On the other hand, the effect of mixed [r = .31] expectations formed by student, peer, or teacher expectations on student achievement was not significant. Hence, teacher expectations have the strongest and most positive relation with student achievement.

14.4 Conclusion

A total of 67 research studies published between 2005 and 2016, with 104,926 participants, were included in this meta-analysis study aiming to examine the magnitude of the effect size of expectation on student achievement. The type of publication, sample group, school subject or assessment type, country, the year of the studies, and the source of expectation were considered as moderator variables in the study. The results of the meta-analysis showed that there is a medium level positive effect of expectation on student achievement. Such a meta-analysis study examining the aforementioned relationship has not been encountered before in the literature, although there are some other studies investigating the different kinds of expectations and concluding that these expectations had a significant effect on the achievements of students. A meta-analysis study conducted by Fan and Chen (2001) revealed that parents' expectations, which constitute one dimension of parent participation/involvement, have a medium level effect on students' achievement. This study suggests that parental expectations are positively correlated with academic achievement. Other meta-analysis studies (Hill and Tyson 2009; Jeynes 2005, 2007) looking at the relationship between parental involvement and student achievement have reached the same conclusion that parental expectations influence student achievement. On the other hand, Tavani and Losh (2003) who studied the psychological variables related to academic achievement concluded that student expectations strongly predicted their achievement and that students' self-beliefs and academic attainment are strongly related. Sanders et al. (2001) and Maskey (2012) have also found a relationship between achievement and student expectations. Moreover, there are a number of studies showing the effects of teacher expectations on students' self-perceptions (Rubie-Davies 2006) and hence on student achievement (Rubie-Davies 2007; Smith 1980; Weinstein 2002). Additionally, these three kinds of expectations may influence each other as argued by certain studies for the pairwise groupings (Englund et al. 2004; Zhang et al. 2011).

As different sources of expectations are listed in the literature, this study aimed to test the effect of these different sources treating them as a moderator variable. According to the moderator variable analysis, the source of expectations has been found to play a moderator role in the effect of expectation on student achievement. This result suggests that the effect sizes of the different sources of expectations differ from each other. Moreover, according to the results of the moderator analysis, teachers' expectations have the highest effect size while parents' expectations have the smallest effect size. Similarly, there are studies (Muller 1998) in the literature supporting the argument that teachers' expectations are more influential on student achievement than other kinds of expectations. Ma (2001) has suggested, however, that parents' expectations about their children have a greater effect on students than the expectations of teachers or peers.

The type of publication has also been a moderator variable in the effect of expectation on student achievement. The articles had higher effect sizes than the theses/dissertations.

Regarding the countries in which the research studies examined were conducted, the country variable has been found to play a moderator role in the effect of expectation on student achievement. The sample groups chosen from vertical-collectivist countries yielded higher levels of effect size than the sample grouped from horizontal-individualist countries. This result may be interpreted in the same way that the meta-analysis results of the effect of parent involvement on achievement were interpreted in another chapter of this book. The dual categorization of countries used in this research informs us that people in vertical-collectivist countries focus on enhancing the cohesion and status of their in-groups, while people in the horizontal-individualist countries tend to express their uniqueness and self-reliance (Shavitt et al. 2011). Triandis and Gelfand (1998) also define vertical collectivism as seeing the self as part of a collective, while horizontal individualism is defined as seeing the self as fully autonomous. Although there is no meta-analysis study in the literature focusing on this topic, there are some meta-analysis studies on the effect of teacher expectations and parental involvement (including parent expectations) on student achievement. These studies did not have a moderator variable of country, but they included the variable of ethnicity and analyzed its effect. These studies (Baron et al. 1985; Dusek and Joseph 1985; McKown and Weinstein 2008; Tenenbaum and Ruck 2007) found statistical differences in the effect size of teacher expectations on achievement according to ethnicity.

Regarding the variables of sample group, school subject and year of publication, the moderator analysis showed that the level of effect of expectation on student performance was not statistically significant for the various sub-categories of those variables. The effect sizes of the sub-categories of sample group (education level) were quite similar except for the university level, the effect size of which is lower than the effect size of the other level. This suggests that the relationship between expectation and achievement does not change throughout the school years until university, but it changes after entering university. This may be the result of the autonomy that the students have when they attend university. Arguably, the effect of teachers' expectations decreases as students move to the next school level; as they become more autonomous they are less easily influenced by teachers' perceptions (Rubie-Davies et al. 2010). Furthermore, parental expectations also tend to remain stable across the schooling years, which in turn influences students' academic performance at later grades (Entwisle et al. 2005). The effect sizes of the subgroups of school subject and publication year were also similar. The highest effect sizes were observed in the language subgroup of school subject and in the subgroup of the years between 2005 and 2008 with regard to publication year.

The results of this meta-analytic study are hard to interpret in that there is no other meta-analysis study encountered in the literature on the relationship of general expectation and student achievement. Given, however, that it is an important psychological construct influencing student achievement as seen from the above findings, expectation should be studied both in its general sense and in its sub-components (the different sources of expectation). The findings concerning the effect of expectation on student performance can be summarized as below:

- Expectation has a medium level positive effect on student achievement [r = .32],
- Publication type, country, and source of expectation have been found to be moderator variables for the relationship between the expectation and student achievement, while the variables of sample group, school subject and publication year do not have a moderator role in this relationship.

In light of the findings of this study, it can be argued that expectations have a remarkable effect on student performance, which is thought to be the main outcome of education. Drawing attention to the different kinds of expectations, this meta-analysis adds to the existing literature in that it reveals the need for further in-depth studies examining the relationship between expectation and student performance.

References

Note. "*" References marked with an asterisk indicate studies included in the meta-analysis. The in-text citations to studies selected for meta-analysis are not followed by asterisks.

Adeniji-Neill, D. (2008). *Parental expectations in education: A qualitative study of the expectations of Nigerian voluntary immigrants to the United States for their children's school achievement* (Doctoral dissertation). University of Hawai, ProQuest Dissertations Publishing (UMI Number: 3326431).

Aldous, J. (2006). Family, ethnicity, and immigrant youths' educational achievements. *Journal of Family Issues, 27*(12), 1633–1667.

Al-Fadhli, H., & Singh, M. (2006). Teachers' expectancy and efficacy as correlates of school achievement in Delta, Mississippi. *Journal of Personnel Evaluation in Education, 19*(1–2), 51–67.

Alvidrez, J., & Weinstein, S. R. (1999). Early teacher perceptions and later student academic achievement. *Journal of Educational Psychology, 91,* 731–746.

Andrusik, K. N. (2011). *The contributions of expectancy value theory and special education status to reading achievement of African American adolescents* (Doctoral dissertation). University of Maryland, College Park, ProQuest Dissertations Publishing (UMI Number: 3461481).*

Baron, R. M., Tom, D. Y. H., & Cooper, H. M. (1985). Social class, race and teacher expectations. In J. B. Dusek (Ed.), *Teacher expectancies* (pp. 251–269). Hillsdale, N. J.: Lawrence Erlbaum.

Bodovski, K., & Farkas, G. (2008). "Concerted cultivation" and unequal achievement in elementary school. *Social Science Research, 37,* 903–919.*

Borenstein, M., Hedges, L. V., Higgins, J. P. T., & Rothstein, H. R. (2009). *Introduction to meta-analysis*. UK: Wiley.

Boxer, P., Goldstein, S. E., DeLorenzo, T., Savoy, S., & Mercado, I. (2011). Educational aspiration–expectation discrepancies: Relation to socioeconomic and academic risk-related factors. *Journal of Adolescence, 34*, 609–617.*

Buff, A., Reusser, K., Rakoczy, K., & Pauli, C. (2011). Activating positive affective experiences in the classroom: "Nice to have" or something more? *Learning and Instruction, 21*, 452–466.*

Bui, K. (2001). Educational expectations and academic achievement among middle and high school students. *Education, 127*(3), 328–331.

Bui, K. (2007). Educational expectations and academic achievement among middle and high school students. *Education, 127*(3), 328–331.*

Carden, D. L. (2005). *Parental expectations and the role of parent involvement in an independent school* (Doctoral dissertation). The University of Alabama, ProQuest Dissertations Publishing, (UMI Number: 3210436).

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences.* Hillside, NJ: Lawrence Erlbaum Associates.

Craft, S. A. (2005). *Ethnic differences in the relationship between self-efficacy, outcome expectations, and academic achievement for first-year college students* (Doctoral dissertation). Duke University, ProQuest Dissertations Publishing (UMI Number: 3231782).*

Cupani, M., de Minzi, M. C. R., Perez, E. R., & Pautassi, R. M. (2010). An assessment of a social-cognitive model of academic performance in mathematics in Argentinean middle school students. *Learning and Individual Differences, 20*, 659–663.*

Darley, J. M., & Fazio, R. H. (1980). Expectancy-confirmation processes arising in the social interaction sequence. *American Psychologist, 35,* 867–881.

Davis-Kean, P. (2009 tarihi kontrol et metin 2005). Race differences in parental influences on child achievement: Multiple pathways to success. *Merrill Palmer Quarterly,* 55(3), 285–318.

Defreitas, S. C. (2012). Differences between African American and European American first-year college students in the relationship between self-efficacy, outcome expectations, and academic achievement. *Social Psychology of Education, 15,* 109–123.*

Derbigny, L. T. R. (2011). *The relationship among racial identity, subscription to stereotypic roles, perceived environmental expectations, and academic achievement in adolescent*

African-American girls (Doctoral dissertation). University of Southern California, ProQuest Dissertations Publishing (UMI Number: 3477878).*

Diamond, J., & Gomez, K. (2004). African American parents' educational orientations: The importance of social class and parents' perceptions of schools. *Education and Urban Society, 36*(4), 383–427.

Dickhauser, O., Reinhard, M. A., Diener, C., & Bertrams, A. (2009). How need for cognition affects the processing of achievement-related information. *Learning and Individual Differences, 19*, 283–287.*

Domenech-Betoret, F., Gomez-Artiga, A., & Lloret-Segura, S. (2014). Personal variables motivation and avoidance learning strategies in undergraduate students. *Learning and Individual Differences, 35*, 122–129.*

Durik, A. M., Shechter, O. G., Noh, M., Rozek, C. S., & Harackiewicz, J. M. (2015). What if I can't? Success expectancies moderate the effects of utility value information on situational interest and performance. *Motivation and Emotion, 39*, 104–118.*

Dusek, J. B., & Joseph, G. (1985). The bases of teacher expectancies. In J. B. Dusek (Ed.), *Teacher expectancies* (pp. 229–250). Hillsdale, N. J.: Lawrence Erlbaum.

Eccles, J. S. (1983). Expectancies, values, and academic behavior. In J. T. Spence (Ed.), *Achievement and achievement motives* (pp. 75–146). San Francisco: W. H. Freeman.

Eccles, J. S., & Wigfield, A. (2002). Motivational beliefs, values, and goals. *Annual Review of Psychology, 53,* 109–132.

Englund, M. (2004). Children's achievement in early elementary school: Longitudinal effects of parental involvement, expectations, and quality of assistance. *Journal of Educational Psychology, 96*(4), 723.

Englund, M. M., Luckner, A. E., Whaley, G. J. L., & Egeland, B. (2004). Children's achievement in early elementary school: Longitudinal effects of parental involvement, expectations, and quality of assistance. *Journal of Educational Psychology, 96*(4), 723–730.

Entwisle, D. R., Alexander, K. L., & Olson, L. S. (2005). First grade and educational attainment by age 22: A new story. *American Journal of Sociology, 110*(5), 1458–1502.

Fan, X., & Chen, M. (2001). Parental involvement and students' academic achievement: A meta-analysis. *Educational Psychology Review, 13*(1), 1–22.

Feldman, D. B., & Kubota, M. (20159. Hope, self-efficacy, optimism, and academic achievement: Distinguishing constructs and levels of specificity in predicting college grade-point average. *Learning an Individual Differences, 37*, 210–216.*

Gallahar, T. M. (2009). *Students' perceptions of teachers' expectations as predictors of academic achievement in mathematics* (Doctoral dissertation). The University of Alabama, ProQuest Dissertations Publishing (UMI Number: 3385372).*

Garcia, J. N. (2014). *Teacher and parent beliefs and expectations of parental involvement and how it relates to student academic achievement* (Doctoral dissertation). Texas State University—San Marcos, ProQuest Dissertations Publishing (UMI Number: 3681031).*

Good, T., & Brophy, J. (2000). *Looking in classrooms* (8th ed.). New York: Longman.

Graves, S. (2010). Are we neglecting African American males?: Parental involvement differences between African American males and females during elementary school. *Journal of African American Studies, 14,* 263–276.

Gray, D. L., Chang, Y., & Anderman, E. M. (2015). Conditional effects of mastery goal structure on changes in students' motivational beliefs: Need for cognition matters. *Learning and Individual Differences, 40*, 9–21.*

Grinstein-Weiss, M., Yeo, Y., Irish, K., & Zhan, M. (2009). Parental assets: A pathway to positive child educational outcomes. *Journal of Sociology and Social Welfare, 36*(1), 61–85.

Guo, J., Marsh, H. W., Parker, P. D., Morin, A. J. S., & Yeung, A. S. (2015). Expectancy value in mathematics gender and socioeconomic background as predictors of achievement and aspirations: A multi-cohort study. *Learning and Individual Differences, 37*, 161–168.*

Hedges, L. V., & Olkin, I. (1985). *Statistical method for meta-analysis*. United Kingdom: Academic Press.

Hester, D. (2006). *Self-perception, teachers' expectations, and reading achievement in elementary children* (Master's thesis). California State University, Fresno, ProQuest Dissertations Publishing (UMI Number: 1443544).*

Hill, N. E., & Tyson, D. F. (2009). Parental involvement in middle school: A meta-analytic assessment of the strategies that promote achievement. *Developmental Psychology, 45*(3), 740–763.

Hill, S. (2001). Class, race, and gender dimensions of child rearing in African American families. *Journal of Black Studies, 31*(4), 494–508.

Hood, M., Creed, P. A., & Neumann, D. L. (2012). Using the expectancy value model of motivation to understand the relationship between student attitudes and achievement in statistics. *Statistics Education Research Journal, 11*(2), 72–85.*

Imes, A. E. (2008). *From expectations to success: Examining the relation of educational expectations to educational attainment for African American and white adolescents* (Doctoral dissertation). The University of Texas at Austin, ProQuest Dissertations Publishing (UMI Number: 3557948).*

Jeynes, W. H. (2005). A meta-analysis of the relation of parental involvement to urban elementary school student academic achievement. *Urban Education, 40*(3), 237–269.

Jeynes, W. H. (2007). The relationship between parental involvement and urban secondary school student academic achievement. A meta-analysis. *Urban Education, 42*(1), 82–110.

Johnson, W., McGue, M., & Iacono, W. G. (2007). Socioeconomic status and school grades: Placing their association in broader context in a sample of biological and adoptive families. *Intelligence, 35,* 526–541.*

Jones, B. D., Paretti, M. C., Hein, S. F., & Knott, T. W. (2010). An analysis of motivation constructs with first-year engineering students: Relationships among expectancies, values, achievement, and career plans. *Journal of Engineering Education, 99*(4), 319–336.*

Jones, E. E. (1986). Interpreting interpersonal behavior: The effects of expectancies. *Science, 234,* 41–46.

Jussim, L. (1986). Self-fulfilling prophecies: A theoretical and integrative review. *Psychological Review, 93*(4), 429–445.

Karp, J. M. (2010). *Teacher expectations and the mediation effects of trust on eighth grade adolescent academic self-efficacy and achievement* (Doctoral dissertation). Dowling College, ProQuest Dissertations Publishing (UMI Number: 3405781).*

King Lewis, G. D. (2014). *The achievement gap: Teachers' expectations and reading achievement of African American middle school students* (Doctoral dissertation). Walden University, ProQuest Dissertations Publishing (UMI Number: 3670316).*

Kleemans, T., Segers, E., & Verhoeven, L. (2013). Relations between home numeracy experiences and basic calculation skills of children with and without specific language impairment. *Early Childhood research Quarterly, 28*, 415–423.*

Knape, E. O. (2010). *Predicting high school graduation for Latino males using expectancy value theory of motivation and tenth grade reading achievement scores* (Doctoral dissertation). University of Florida, ProQuest Dissertations Publishing (UMI Number: 3585142).*

Kuklinski, M. R., & Weinstein, R. (2000). The stability of teacher expectations and perceived differential teacher treatment. *Learning Environments Research, 3*(1), 1–34.

Kulinskaya, E., Morgenthaler, S., & Staudte, R. G. (2008). *Meta-analysis: A guide to calibrating and combining statistical evidence*. London: John Wiley & Sons.

Lazarides, R., & Watt, H. M. G. (2015). Girls' and boys' perceived mathematics teacher beliefs, classroom learning environments and mathematical career intentions. *Contemporary Educational Psychology, 41*, 51–61.*

Lee, V., & Smith, J. (1996). Collective responsibility for learning and its effects on gains in achievement for early secondary school students. *American Journal of Education, 104*(2), 103–147.

Lee, V., Smith, J., Perry, T., & Smylie, M. (1999). *Social support, academic press, and student achievement: A view from the middle grades in Chicago*. Chicago, IL: A Report of the Chicago Annenberg Research Project.

Lee, V. E., & Smith, J. B. (1999). Social support and achievement for young adolescents in Chicago: The role of school academic press. *American Educational Research Journal, 36*(4), 907–945.

Lent, R. W., Miller, M. J., Smith, P. E., Watford, B. A., Him, R. H., & Hui, K. (2016). Social cognitive predictors of academic persistence and performance in engineering: Applicability across gender and race/ethnicity. *Journal of Vocational Behavior, 94*, 79–88.*

Levi, U., Einav, M., Ziv, O., Raskind, I., & Margalit, M. (2014). Academic expectations and actual achievements: the roles of hope and effort. *European Journal of Psychology of Education, 29* (3), 367–386.*

Lucio, R., Rapp-Paglicci, L., & Rowe, W. (2011). Developing an additive risk model for predicting academic index: School factors and academic achievement. *Child and Adolescent Social Work Journal, 28,* 153–173.

Ma, X. (2001). Participation in advanced mathematics: Do expectation and influence of students, peers, teachers, and parents matter? *Contemporary Educational Psychology, 26*(1), 132–146.

Madon, S., Jussim, L., & Eccles, J. (1997). In search of the powerful self-fulfilling prophecy. *Journal of Personality and Social Psychology, 72,* 791–809.

Martin Krumm, C. P., Sarrazin, P. G., & Peterson, C. (2005). The moderating effects of explanatory style in physical education performance: A prospective study. *Personality and Individual Differences, 38*, 1645–1656.*

Maskey, V. (2012). Grade expectation and achievement: Determinants and influential relationships in business courses. *American Journal of Educational Studies, 5*(1), 71–88.*

McKown, C., & Winstein, R. S. (2008). Teacher expectations, classroom context and the achievement gap. *Journal of School Psychology, 46,* 235–261.*

Merton, R. K. (1948). The self-fulfilling prophecy. *Antioch Review, 8,* 193–210.

Mistry, R. S., White, E. S., Benner, A. D., & Huynh, V. W. (2009). A longitudinal study of the simultaneous influence of mothers' and teachers' educational expectations on low-income youth's academic achievement. *Journal of Youth and Adolescence, 38*(6), 826–838.*

Moosmann, D. A. V., Roosa, M. W., & Knight, G. P. (2014). Generational patterns in Mexican Americans academic performance in an unwelcoming political context. *Journal of Applied Developmental Psychology, 35*, 102–110.*

Muller, C. (1998). The minimum competency exam requirement, teachers' and students' expectations and academic performance. *Social Psychology of Education, 2*(2), 199–216.

Nelson, C. D. (2015). *Relationship between first-generation college students' expectations for experiences with faculty members and students' success after the first year* (Doctoral dissertation). University of South Florida, ProQuest Dissertations Publishing (UMI Number: 3688408).*

Nicholson, L., Putwain, D., Connors, L., & Hornby-Atkinson, P. (2013). The key to successful achievement as an undergraduate student: Confidence and realistic expectations? *Studies in Higher Education, 38*(2), 285–298.*

Novak, K. R. (2009). *Teacher expectancy, teacher efficacy, and curriculum choice as factors in middle school achievement* (Doctoral dissertation). Boston University, ProQuest Dissertations Publishing (UMI Number: 3357767).*

Oh, Y. J. (2008). *The relationship between student perceptions of parental expectations, utility value, aptitude, and English achievement among Asian American high school students* (Doctoral dissertation). University of Southern California, ProQuest Dissertations Publishing (UMI Number: 3324947).*

Parsley, K., & Corcoran, C. (2003). The classroom teacher role in preventing school failure. *Kappa Delta Pi, 39*(2), 84–87.

Patrikakou, E. N. (1997). A model of parental attitudes and the academic achievement of adolescents. *Journal of Research & Development in Education, 31,* 7–26.

Peterson, E. R., Rubie-Davies, C., Osborne, D., & Sibley, C. (2016). Teachers' explicit expectations and implicit prejudiced attitudes to educational achievement: Relations with student achievement and the ethnic achievement gap. *Learning and Instruction, 42*, 123–140.*

Phillipson, S., & Phillipson, S. N. (2007). Academic expectations, belief of ability, and involvement by parents as predictors of child achievement: A cross-cultural comparison. *Educational Psychology, 27*(3), 329–348.*

Phillipson, S., & Phillipson, S. N. (2012). Children's cognitive ability and their academic achievement: the mediation effects of parental expectations. *Asia Pacific Education Review, 13*(3), 495–508.*

Piciullo, T. J. (2009). *School membership, parent academic expectations, peer relationships, student-teacher relationships, academic self-concept, and academic achievement among ninth grade students from low, average, and high need schools* (Doctoral dissertation). Dowling College, ProQuest Dissertations Publishing (UMI Number: 3368241).*

Plante, I., O'keefe, P. A., & Théorêt, M. (2013). The relation between achievement goal and expectancy-value theories in predicting achievement-related outcomes: A test of four theoretical conceptions. *Motivation and Emotion*, *37*, 65–78.*

Reader, T. (2013). *The relationship between high school students' attributions and achievement and their perceptions of teachers' expectations* (Doctoral dissertation). The Claremont Graduate University, ProQuest Dissertations Publishing (UMI Number: 3605536).*

Ricks, L. E. (2010). *A study of black and white teachers' expectations and students' academic achievement at a southeastern Virginia public high school* (Doctoral dissertation). Regent University, ProQuest Dissertations Publishing (UMI Number: 3392175).*

Rivera, V. Y. (2012). *The impact of teachers' expectations, parents' expectations, and academic self-efficacy on the achievement of English language learners* (Doctoral dissertation). Texas A&M University, ProQuest Dissertations Publishing (UMI Number: 3532231).*

Rodriguez, C. M. (2014). *The relationship between teacher expectations and teacher self-efficacy as it pertains to student success* (Doctoral dissertation). Claremont Graduate University, ProQuest Dissertations Publishing (UMI Number: 3668382).*

Rosenthal, R., & Jacobson, L. (1968). *Pygmalion in the classroom: Teacher expectation and pupils' intellectual development*. New York: Holt.

Rubie-Davies, C. M. (2006). Teacher expectations and student self-perceptions: Exploring relationships. *Psychology in the Schools, 43*(5), 537–552.

Rubie-Davies, C. M. (2007). Classroom interactions: Exploring the practices of high and low-expectation teachers. *British Journal of Educational Psychology, 77*(2), 289–306.

Rubie-Davies, C. M., Peterson, E., Irving, E., Widdowson, D., & Dixon, R. (2010). Expectations of achievement: Student, teacher and parent perceptions. *Research in Education, 83*(1), 36–53.

Rubie-Davies, C. M., & Peterson, E. R. (2016). Relations between teachers' achievement, over- and underestimation, and students' beliefs for Maori and Pakeha students. *Contemporary Educational Psychology* (Article in Press).*

Rubie-Davies, C. M., Weinstein, R. S., Huang, F. L., Gregory, A., Cowan, P. A., & Cowan, C. P. (2014). Successive teacher expectation effects across the early school years. *Journal of Applied Developmental Psychology, 35*, 181–191.*

Sanders, C. E., Field, T. M., & Diego, M. A. (2001). Adolescents' academic expectations and achievement. *Adolescence, 36*(144), 795–802.

Schmitt-Wilson, S., & welsh, M. C. (2012). Vocational knowledge in rural children: A study of individual differences and predictors of occupational aspirations and expectations. *Learning and Individual Differences, 22*, 862–867.*

Seeley, B. G. (2012). *Predicting children's academic achievement from parental aspirations, expectations, help with schoolwork, and home learning and language materials* (Doctoral dissertation). Arizona State University, ProQuest Dissertations Publishing (UMI Number: 3502628).*

Seyfried, S., & Chung, I. (2003). Parent involvement as parental monitoring of student motivation and parent expectations predicting later achievement among African American and European American middle school age students. *Journal of Ethnic Cultural Diversity in Social Work, 77,* 109–131.

Shavitt, S., Johnson, T. P., & Zhang, J. (2011). Horizontal and vertical cultural differences in the content of advertising appeals. *Journal of International Consumer Marketing, 23*(3–4), 297–310.

Shouse, R. (1996). Academic press and sense of community: Conflict, congruence, and implications for student achievement. *Social Psychology of Education, 1*(47), 47–68.

Smith, M. L. (1980). Teacher Expectations. *Evaluation in Education, 4,* 53–55.

Steinmayr, R., Wirthwein, L., & Schone, C. (2014). Gender and numerical intelligence: Does motivation matter? *Learning and Individual Differences, 32*, 140–147.*

Stern, M. H. (2006). *Parents' academic expectations, children's perceptions, and the reading achievement of children at varying risk* (Doctoral dissertation). The University of North Carolina at Chapel Hill, ProQuest Dissertations Publishing (UMI Number: 3239232).*

Su, W. (2012). *Explaining the link between parental educational expectations and Chinese high school students' academic achievement: The roles of psychological distress, parental involvement, and filial piety* (Doctoral dissertation). The University of Alabama at Birmingham, ProQuest Dissertations Publishing (UMI Number: 3512324).*

Sulimani-Aidan, Y. (2015). Do they get what they expect?: The connection between young adults' future expectations before leaving care and outcomes after leaving care. *Children and Youth Services Review, 55*, 193–200.*

Tanaka, A., Takehara, T., & Yamauchi, H. (2006). Achievement goals in a presentation task: Performance expectancy, achievement goals, state anxiety, and task performance. *Learning and Individual Differences, 16,* 93–99.*

Tavani, C. M., & Losh, S. C. (2003). Motivation, self-confidence, and expectations as predictors of the academic performances among our high school students. *Child Study Journal, 33*(3), 141–151.

Taylor, R. D., & Lopez, E. I. (2005). Family management practice, school achievement, and problem behavior in African American adolescents: Mediating processes. *Journal of Applied Psychology, 26*, 39–49.*

Temple, A. (2012). *A model of student engagement and academic achievement: The role of teacher-student relationships and teacher expectations* (Doctoral dissertation). Wayne State University, ProQuest Dissertations Publishing, (UMI Number: 3504032).*

Tenenbaum, H. R., & Ruck, M. D. (2007). Are teachers' expectations different for racial minority than for European American students? A meta-analysis. *Journal of Educational Psychology, 99* (2), 253–273.

Teshima, A. (2013). *Effects of parent's belief, generational status, and household language, on expectation, in predicting child's academic achievement* (Master's thesis). California State University, Fullerton, ProQuest Dissertations Publishing (UMI Number: 1523979).*

Triandis, H. C., & Gelfand, M. J. (1998). Converging measurement of horizontal and vertical individualism and collectivism. *Journal of Personality and Social Psychology, 74*(1), 118–128.

Turner, H., Rubie-Davies, C., & Webber, M. (2015). Teacher expectations, ethnicity and the achievement gap. *New Zealand Journal of Educational Studies, 50*(1), 55–69.*

Villiger, C., Wandeler, C., & Niggli, A. (2014). Explaining differences in reading motivation between immigrant and native students: The role of parental involvement. *International Journal of Educational Research, 64*, 12–25.*

Walkey, F. H., McClure, J., Meyer, L. H., & Weir, K. F. (2013). Low expectations equal no expectations: Aspirations motivation and achievement in secondary school. *Contemporary Educational Psychology, 38,* 306–315.*

Wang, Y. (2015). A trend study of the influences of parental expectation, parental involvement, and self-efficacy on the English academic achievement of Chinese eighth graders. *International Education, 44*(2), 45–68.*

Weeks, J. C. (2008). *African American parents' academic expectations for their children and their experiences with schools.* (Doctoral dissertation). University of Houston, ProQuest Dissertations Publishing (UMI Number: 3340598).

Weinstein, R. S. (2002). *Reaching higher: The power of expectations in schooling*. Cambridge MA: Harvard University Press.

Weinstein, R. S., & McKown, C. (1998). Expectancy effects in "context": Listening to voices of students and teachers. In J. Brophy (Ed.), *Advances in research on teaching: Expectations in the classroom* (Vol. 7, pp. 215–242). Greenwich, CT: JAI.

Wigfield, A., & Eccles, J. S. (2002). The development of competence beliefs, expectancies for success, and achievement values from childhood through adolescence. In G. Phye (Ed.), *Development of achievement motivation* (pp. 91–120). San Diego: Academic Press.

Williams, B. R. (2007). *Ninth grade student perceptions of sense of school membership, parent academic expectations, and peer relationships as related to academic achievement* (Doctoral dissertation). Dowling College, ProQuest Dissertations Publishing (UMI Number: 3275710).*

Wilson, P. M., & Wilson, J. R. (1992). Environmental influences on adolescence educational aspirations. *Youth & Society, 24,* 52–70.

Wood, D., Kurtz-Costes, B., Okeke-Adeyanju, N., & Rowley, S. (2010). Mother's academic gender stereotypes and education-related beliefs about sons and daughters in African American families. *Journal of Educational Psychology, 102*(2), 521–530.

Woolley, M. E., Structhens, M. E., Gilbert, M. C., & Martin, W. G. (2010). Mathematics success of black middle school students: Direct and indirect effects of teacher expectations and reform practices. *The Negro Educational Review, 61*, 41–59.*

Wu, F., & Qi, S. (2006). Longitudinal effects of parenting on children's academic achievement in African American families. *The Journal of Negro Education, 75*(3), 415–429.

Youse, K. E. (2012). *Locus of control and academic achievement: Integrating social learning theory and expectancy-value theory* (Doctoral dissertation). Temple University, ProQuest Dissertations Publishing (UMI Number: 3510454).*

Zhang, Y., Haddad, E., Torres, B., & Chen, C. (2011). The reciprocal relationships among parents' expectations, adolescents' expectations, and adolescents' achievement: A two-wave longitudinal analysis of the NELS data. *Journal of Youth and Adolescence, 40*(4), 479–489.

Zhu, X. (2009). *Examining the relation between student expectancy-value motivation, achievement in middle-school physical education, and after-school physical activity participation* (Doctoral dissertation). University of Maryland, College Park, ProQuest Dissertations Publishing (UMI Number: 3372939).*

Chapter 15
The Effect of Self-Esteem on Student Achievement

Serdar Körük

15.1 Introduction

Self-esteem is defined as the set of positive or negative evaluations of individuals about their own selves (Rosenberg 1965). Self and self-esteem constitute two different dimensions of personality. The self represents the cognitive part of the personality, whereas self-esteem represents the affective and psychologic dimension. The personality traits of the individuals, their physical features, abilities, skills, social relations, feelings and their ideas about their academic or professional performance and the satisfaction they feel as a result of these ideas, are included in the concept of self-esteem (Yılmaz 2000; İzgiç et al. 2001). A high level of perceived satisfaction indicates that the individual has high self-esteem, whereas a low level of satisfaction indicates low self-esteem. Özkan (1994) defined people with high self-esteem as individuals who are successful in academic and professional areas, who can handle stress, who can establish social and close relations and who have a high level of vitality and enjoyment. At the same time, he defined people with low self-esteem as individuals who have a low level of vitality and enjoyment, who are not self-confident, who feel shame and feelings of worthlessness and who feel inadequate in terms of successes and skills.

The formation of self-image in individuals starts in their babyhood and early childhood periods through the verbal and non-verbal signals that they receive from their parents who are the primary objects of connection (Demiriz and Öğretir 2007). Towards the early childhood period, when the cognitive level is developed, the baby starts to create his or her self-esteem by evaluating his or her physical properties, abilities, strengths and weaknesses. Nine months old babies start to realize that they are mentally different from each other, and they develop their verbal self when they are eighteen months old. The progress of infants' cognitive

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level develops their social relations and allows the babies to better perceive and interpret the signals that they get from their surroundings (Atkinson et al. 1995; Özdağ 1999). It is argued in the literature that fulfilling adequately the physical needs of the babies in their first two years through the love, care and affection of their mothers affects self-esteem positively creating the schema that the baby is someone who is worth of attention and love (Erikson 1968). As the child grows older, being appreciated and supported by his or her environment increases his or her self-esteem, whereas a lack of support, negative evaluations, frequent comparison with other individuals and a lack of positive feedback may decrease his or her self-esteem.

Various psychological theories have suggested different explanations for the formation of self-esteem. According to the Adlerian Individual Psychology Theory, self-esteem represents the shift from feelings of inferiority to a sense of superiority. At the same time, it was emphasized that factors such as illnesses, family circumstances, family communication, birth order and inability in establishing social relationships play an important role in the formation of self-esteem (Eşer 2005). Erikson (1968) has divided the development of the individual into eight periods (from birth till death), and he stated that each period includes a conflict between two opposite charges that the individual should solve. According to Erikson's Psychosocial Development Theory, as the individuals solve these conflicts positively and as expected, their self-esteem increases. Sullivan (1953) has examined the basis of self-esteem within the family relations and reported that the child's self-esteem is influence by the parents-child relations, the way parents treat the child and the reward-punishment system that they employ. Rogers (1951) has argued that self-esteem improves in an environment where individuals can express their feelings and ideas comfortably, through the acceptance of other people and by being respected and appreciated. According to Rogers, individuals who grow up in a repudiative and rigid environment have low self-esteem because they did not have the opportunity to express themselves. On the contrary, individuals who grow up in flexible, comfortable and affirmative environments which allow self-expression will have high self-esteem. Maslow explained the development of self-esteem through his hierarchy of needs framework and pyramid. Self-actualization is placed at the top of the pyramid and the steps towards this point increase self-esteem. In other words, climbing from the bottom to the top of the pyramid affects the development of self-esteem (Aktuğ 2006).

It is argued that there is a linear and reciprocal relationship between self-esteem and academic performance (Kaya and Oğurlu 2015). The increase of self-esteem increases academic achievement, and at the same time the increase of academic achievement increases self-esteem (Baumeister et al. 2003). The practices which aim to improve self-esteem they can also increase student achievement (Davies and Brember 1999). Students who can establish a more rational cause and effect relationship about their achievements and failures can better adapt to their academic life. Individuals with high self-esteem are more motivated to be successful in an academic sense since they are able to shape their future goals and expectations according to the abilities and interests they have. In sum, many studies in the literature have shown that self-esteem is an important factor in increasing academic achievement. Among these are the following: studies examining the relationship between self-esteem and overall school achievement (Midget et al. 2002; El-Anzi 2005; Wang 2012; Zuffiano et al. 2013), studies examining the relationship between self-esteem and mathematics achievement (Ciarrochi et al. 2007; Bodkin-Andrews et al. 2010), studies examining the relationship between self-esteem and science achievement (Ciarrochi et al. 2007; Booth and Gerard 2011) and studies examining the relationship between self-esteem and grammar achievement (Pepi et al. 2006; Bodkin-Andrews et al. 2010).

In this study, the effect of the self-esteem on student achievement was investigated. In addition, the factors that are thought to affect the average effect size obtained in the study were set as moderators. These are the following: (*i*) the publication year of the research, (*ii*) the country (culture) where the research was carried out, (*iii*) the course in which the achievement was measured and *(iv)* the level of education.

15.2 Method

15.2.1 Study Design

In this study, the effect of self-esteem on student achievement was tested with a meta-analysis design.

15.2.2 Review Strategy and Criteria for Inclusion/Exclusion

To determine the research studies to include in the meta-analysis, the Science-Direct, Proquest and Ebsco academic databases were used to conduct a literature review. For this process, the terms *self-esteem* and *student achievement/student success* included in the titles of the studies were used to screen the research studies. The end date for the research studies included in the research was identified as January 2016. Doctoral dissertations and peer-reviewed journals were included in the study.

Many strategies were used to identify the research studies that were appropriate for the meta-analysis of the study. First, a research study pool 150 research studies was established; it included all studies with self-esteem and student achievement/ success in their titles. The abstracts of these studies were reviewed, and all were found to be appropriate to include in the study. In the second stage, all research studies in the pool were examined in detail. The results of the examination found that 46 of the research studies in the pool were appropriate, and 104 were not found

Table 15.1 Characteristics of the studies included in the meta-analysis

Variables		1	2	3	4	Total
Publication year		2000–2004	2005–2009	2010–2014	2015 and beyond	
	n	2	13	29	2	46
	%	4	29	63	4	100
Publication type		Articles				
	n	46				46
	%	100				100

to be suitable. The descriptive statistics of the 46 research studies included in the analysis are presented in Table 15.1.

The criteria for inclusion of the research studies in the analysis study were identified as follows:

- To have the statistical information necessary for correlational meta-analysis (n and r, or R^2 values)
- To be a study measuring the correlation school culture and student achievement/ success

Reasons for not including a research study in the meta-analysis:

- Having no quantitative data (qualitative research)
- Not having a correlation coefficient
- Not focusing on student achievement
- Not focusing on self-esteem

15.2.3 Coding Process

The coding process was essentially a data sorting process used to ascertain which data were clear and suitable for the study. In this scope, a coding form was developed before the statistical analysis was conducted, and the coding was conducted according to the form. The main aim was to develop a specific coding system that allowed the study to see the entirety of the research studies in general and that would not miss any characteristics of each individual research study. The coding form developed in the study was comprised of:

- References for the research
- Sample information
- Sample group
- School subject
- The years of the studies
- Data collection tool(s)
- Quantitative values

15.2.4 Statistical Processes

The effect size acquired in meta-analysis is a standard measure value used in the determination of the strength and direction of the relationship in the study (Borenstein et al. 2009). Pearson's correlation coefficient (r) was determined to be the effect size in this study. Because the correlation coefficient has a value between $+1$ and -1, the r value calculated was evaluated by converting this value into the value as it appears in the z table (Hedges and Olkin 1985). Provided that more than one correlation value is given between the same structure categories in correlational meta-analysis studies, two different approaches are used in the determination of the one to be used in the meta-analysis (Borenstein et al. 2009; Kulinskaya et al. 2014). For this study, (*i*) first, if the correlations were independent, all the related correlations were included in the analysis and were considered to be independent studies, and (*ii*) if there were dependent correlations, then the *highest correlation value* was accepted. A *random effect model* was used for the meta-analysis processes in this study. The *Comprehensive Meta-Analysis* program was used in the meta-analysis process.

15.2.5 Moderator Variables

To determine the statistical significance of the differences between the moderators of the study, only the Q_b values were used. Four moderator variables that were expected to have a role in the average effect size were identified in the study. The first of these considered is the *the years of the study* as a moderator in regards to the relationship between self-esteem and student achievement. The second is the *region of the sample group* which was thought to have a role on the average impact of self-esteem on student achievement. The rest are *the school subject* and *the grade of students*.

15.2.6 Publication Bias

A funnel plot for the research studies included in the meta-analysis of can be seen in Fig. 15.1. Evidence that publication bias affected the research studies included in the meta-analysis can be seen in Fig. 3.1. A serious asymmetry would be expected in the funnel plot if there were a publication bias. The concentration of plots on one side under the line of average effect size, particularly in the bottom section of the funnel, suggests the probability of a publication bias in the research studies. In this study, no evidence of partiality of the publications was observed in any of the 46 data subjected to meta-analysis.

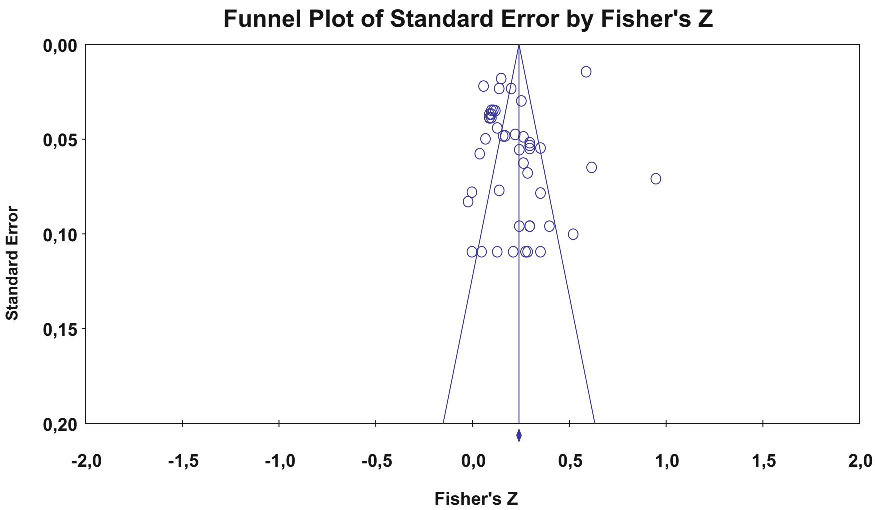

Fig. 15.1 Effect size funnel for publication bias

Table 15.2 Duval and Tweedie's trim and fill test results

	Excluded studies	Point estimate	*CI* (confidence interval)		*Q*
			Lower limit	Upper limit	
Observed values		0,24	0,22	0,25	1002,6
Corrected values	0	0,24	0,22	0,25	1002,6

Although no partiality in publications was observed in the funnel plot, the results of Duval and Tweedie's trim and fill test, which was applied to determine the effect of partiality in publications acquired with the meta-analysis using the random effect model, are given in Table 15.2. As is seen in Table 15.2, there is no difference between the effect observed and the artificial effect size created to fix the effect of the partiality of publications. The research on each side of the center line is symmetrical, and this is the indicator of non-difference. Because there is no evidence indicating lost data on either side of the center line, the difference between the fixed effect size and observed effect size is zero.

15.3 Findings

The results of the meta-analysis about the relationship between self-esteem and student achievement are displayed in Table 15.3. The findings supported hypothesis H_1 which formulated that there is a positive relationship between self-esteem and student achievement. The effect size of self-esteem on student achievement was

Table 15.3 The correlations between self-esteem and student achievement: meta analysis findings

Variable		*k*	*N*	*r*	*CI* (confidence interval)		*Q*	Q_b
					Lower limit	Upper limit		
Self-esteem		46	27419	.24*	.22	.25	1002.6*	
Moderator [publication year]								**24***
2000–2004		2	494	.31*	.22	.39		
2005–2009		11	11434	.18**	.03	.31		
2010–2014		29	15044	.25*	.20	.30		
2015 and beyond		2	447	.02	−.07	.11		
Moderator [region]								**2.8**
Vertical/collectivist		19	9360	.28*	.20	.35		
Horizontal/individualistic		27	18059	.18*	.10	.26		
Moderator [subject]								**10.9****
GPA		24	15488	.25*	.16	.34		
Grammar/literature		5	3508	.12*	.09	.15		
Mathematics		9	6518	.20*	.12	.29		
Science		6	1162	.20*	.09	.32		
English		2	743	.16	.00	.31		
Moderator (grade) kademesi								**8.91****
Primary school		3	602	.57*	.30	.75		
Secondary school		13	5075	.19*	.12	.26		
High school		11	14369	.23*	.10	.36		
College		19	7373	.16*	.12	21		

calculated as .24 which showed that self- esteem has a medium level effect (*see* Cohen 1988) on student achievement.

In the moderator analysis, the effect size differences among the publication years of the studies were found to be statistically significant and hypothesis H_2 is, therefore, validated (Qb = 24.03, $p < .05$). In other words, the publication year of the studies examined is moderator in the positive effect of self-esteem on student achievement.

The findings did not support hypothesis H_3 which stated that the culture where the research was carried out plays a moderator role in the effect of self-esteem on student achievement (Qb = 2.8, $p > .05$). In particular, the effect of self-esteem on student achievement was found to be different in vertical-collectivist countries (r = .28) and horizontal individualistic countries (r = .18).

The hypothesis H_4 indicating that the course in which the achievement was measured is moderator in the positive effect of self-esteem on student achievement is validated (Qb = 10.9, $p < .05$). The effect of self-esteem on student achievement was found to be as follows: grade point average/GPA (r = .25), grammar and literature (r = .12), mathematic (r = .20), science (r = .20) and English (r = .16).

The hypothesis H_5 indicating that the education level of the students whose achievement was measured is a moderator in the positive effect of self-esteem on student achievement is validated (Qb = 8.91, $p < .05$). The effect of self-esteem on student achievement was found to be as follows: primary school (r = .57), secondary school (r = .19), high school (r = .23) and university (r = .16).

15.4 Conclusion

In this meta-analysis study, 46 studies were reviewed for determining the effect of self-esteem on student achievement. The publication year of the studies examined, the course in which the achievement was measured, the education level of the students and the country (culture) where the research was carried out were taken as moderator variables. As a result of the study it was found that that self-esteem has a medium level positive effect on student achievement. This finding is in line with the results from other studies and meta-analyses in the relevant literature (Wickline 2003; Schmidth and Padilla 2003; Stupnisky et al. 2007; Balkıs and Duru 2010; Di Guinta et al. 2013; Soufi et al. 2014; Lackner 2015) which have similarly revealed the association of self-esteem with student achievement.

In this study, it was found that the publication year of the studies included in the meta-analysis is functioning as a moderator. The effect of self-esteem on student achievement was found to be higher in the studies conducted between 2000 and 2004 and between 2010 and 2014. The effect of self-esteem on student achievement is decreasing, however, after 2004. There are similar studies in the literature indicating that this effect decreases as the publication year increases (Hansford and Hattie 1982; Muller et al. 1988; Wickline 2003). Twenge and Campbell (2001) have explained this fact as follows: although self-esteem gradually spreads throughout the student communities, the increase observed in academic achievement is not as high as the increase of self-esteem.

The cultures of the countries where the research was carried out were classified as horizontal-individualistic and vertical-collectivist cultures. The moderation of this cultural difference in the effect of self-esteem on student achievement was subsequently tested, and the results showed that culture is not a moderator. However, the effect of self-esteem on student achievement was found to be higher in vertical-collectivist countries.

It was also found that the education level of the students is functioning as a moderator in the effect of self-esteem on student achievement. The highest effect was observed at the primary school level, the effect decreased subsequently at the secondary school level, it increased again at high schools and it decreased again at the university level. There are similar studies in the literature indicating that the self-esteem of the individual increases as the age increases (Otacıoğlu 2009; Bachman et al. 2011). Wickline (2003) has conducted a meta-analysis study, and the effect order of self-esteem on student achievement according to the education level was found to be the following: primary school, high school, secondary school and university, in decreasing order. It is argued that the increase of self-esteem decreases the effect size.

Finally, it was found that the course in which the achievement was measured is functioning as a moderator in the effect of self-esteem on student achievement. In particular, it was observed that self-esteem is more effective on grade points average, mathematics and science achievement.

References

Note. "*" References marked with an asterisk indicate studies included in the meta–analysis. The in–text citations to studies selected for meta–analysis are not followed by asterisks.

Aktuğ, T. (2006). *Ergenlerde akran baskısı ve benlik saygısının incelenmesi* (Unpublished master's thesis). Mersin Üniversitesi, Mersin, Türkiye.

Atkinson, R., Atkinson, R. C., & Hilgard, E. R. (1995). *Psikolojiye giris* (pp. 125–190). Cağaloğlu, İstanbul: Sosyal Yayınlar.

Bachman, J. G., O'Malley, P. M., Freedman-Doan, P., Trzesniewski, K. H., & Donnellan, M. B. (2011). Adolescent self-esteem: Differences by race/ethnicity, gender, and age. *Self and Identity, 10*(4), 445–473.

Balkıs, M., & Duru, E. (2010). Akademik erteleme eğilimi, akademik başarı ilişkisinde genel ve performans benlik saygısının rolü. *Pamukkale Üniversitesi Eğitim Fakültesi Dergisi*, *27*(27), 159–170.*

Baumeister, R. F., Campbell, J. D., Krueger, J. I., & Vohs, K. D. (2003). Does high self-esteem cause better performance, interpersonal success, happiness, or healthier lifestyles? *Psychological Science in the Public Interest, 4*(1), 1–44.

Bodkin-Andrews, G. H., Seaton, M., Nelson, G. F., Craven, R. G., & Yeung, A. S. (2010). Questioning the general self-esteem vaccine: General self-esteem, racial discrimination, and standardised achievement across indigenous and non-indigenous students. *Australian Journal of Guidance and Counselling, 20*(01), 1–21.*

Booth, M. Z., & Gerard, J. M. (2011). Self-esteem and academic achievement: A comparative study of adolescent students in England and the United States. *Compare: A Journal of Comparative and International Education*, *41*(5), 629–648.*

Borenstein, M., Hedges, L. V., Higgins, J., & Rothstein, H. R. (2009). *References* (pp. 409–414). Wiley.

Ciarrochi, J., Heaven, P. C., & Davies, F. (2007). The impact of hope, self-esteem, and attributional style on adolescents' school grades and emotional well-being: A longitudinal study. *Journal of Research in Personality*, *41*(6), 1161–1178.*

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. New York: Routledge Academic.

Davies, J., & Brember, I. (1999). Reading and mathematics attainments and self-esteem in years 2 and 6-an eight-year cross-sectional study. *Educational Studies, 25*(2), 145–157.

Demiriz, S., & Öğretir, A. D. (2007). Alt ve üst sosyo-ekonomik düzeydeki 10 yaş çocuklarının anne tutumlarının incelenmesi. *Kastamonu Eğitim Dergisi, 15*(1), 105–122.

Di Giunta, L., Alessandri, G., Gerbino, M., Kanacri, P. L., Zuffiano, A., & Caprara, G. V. (2013). The determinants of scholastic achievement: The contribution of personality traits, self-esteem, and academic self-efficacy. *Learning and individual Differences*, *27*, 102–108.*

El-Anzi, F. O. (2005). Academic achievement and its relationship with anxiety, self-esteem, optimism, and pessimism in Kuwaiti students. *Social Behavior and Personality: An International Journal*, *33*(1), 95–104.*

Erikson, E. H. (1968). *Identity: Youth and crisis* (2nd ed.). New York: Norton.

Eşer, H. (2005). *Üniversite öğrencilerinde dini inanç ve benlik saygısı ilişkisi.* (Unpublished master's thesis), Uludağ Üniversitesi, Bursa, Türkiye.

Hansford, B. C., & Hattie, J. A. (1982). The relationship between self and achievement/performance measures. *Review of Educational Research, 52*(1), 123–142.

İzgiç, F., Akyüz, G., & Doğan, O. (2001). Üniversite öğrencilerinde sosyal fobi ve beden imgesi ile benlik saygısı arasındaki ilişkinin araştırılması. *3P Dergisi, 9*(4), 591–598.

Kaya, F., & Oğurlu, Ü. (2015). The relationship among self-esteem, intelligence, and academic achievement Benlik saygısı, zekâ ve akademik başarı ilişkisi. *Journal of Human Sciences, 12*(1), 951–965.

Kulinskaya, E., Morgenthaler, S., & Staudte, R. G. (2014). Combining statistical evidence. *International Statistical Review, 82*(2), 214–242.

Hedges, L. V., & Olkin, I. (1985). *Statistical methods for meta-analysis* (pp. 122–127). London: Academic Press.

Lackner, P. (2015). A meta-analysis investigating the correlation between self-esteem and academic achievement in African Americans: Merging social psychology and a Jesuit Educataion.

Midgett, J., Ryan, B. A., Adams, G. R., & Corville-Smith, J. (2002). Complicating achievement and self-esteem: Considering the joint effects of child characteristics and parent–child interactions. *Contemporary Educational Psychology*, *27*(1), 132–143.*

Muller, J. L., Gullung, P., & Bocci, V. (1988). Concept de soi et performance scolaire: une méta-analyse. Self-concept and academic achievement: A meta-analysis, 53–69.

Otacıoğlu, S. G. (2009). Müzik öğretmeni adaylarının benlik saygısı düzeyleri ile akademik ve çalgı başarılarının karşılaştırılması. *Dicle Üniversitesi Ziya Gökalp Eğitim Fakültesi Dergisi, 13,* 141–150.

Özdağ, Ş. (1999). *Psikodrama gruplarının hemşirelik yüksekokulu öğrencilerinin benlik saygısı, atılgan davranış, empatik eğilim ve empatik beceri düzeylerine etkisi* (Unpublished doctoral dissertation). Hacettepe Üniversitesi, Ankara, Türkiye.

Özkan, İ. (1994). Benlik saygısını etkileyen etkenler. *Düşünen Adam, 7*(3), 4–9.

Pepi, A., Faria, L., & Alesi, M. (2006). Personal conceptions of intelligence, self-esteem, and school achievement in Italian and Portuguese students. *Adolescence*, *41*(164), 615.*

Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.

Rogers, C. R. (1951). *Client centered therapy*. Boston: Houghton Miflin.

Schmidt, J. A., & Padilla, B. (2003). Self-esteem and family challenge: An investigation of their effects on achievement. *Journal of Youth and Adolescence, 32*(1), 37–46.*

Soufi, S., Damirchi, E. S., Sedghi, N., & Sabayan, B. (2014). Development of structural model for prediction of academic achievement by global self-esteem, academic self-concept, self-regulated learning strategies and autonomous academic motivation. *Procedia-Social and Behavioral Sciences*, *114*, 26–35.*

Sullivan, H. S. (1953). *The interpersonal theory of psychiatry*. New York: Norton.

Stupnisky, R. H., Renaud, R. D., Perry, R. P., Ruthig, J. C., Haynes, T. L., & Clifton, R. A. (2007). Comparing self-esteem and perceived control as predictors of first-year college students' academic achievement. *Social Psychology of Education*, *10*(3), 303–330.*

Twenge, J. M., & Campbell, W. K. (2001). Age and birth cohort differences in self-esteem: A cross-temporal meta-analysis. *Personality and Social Psychology Review, 5*(4), 321–344.

Wang, K. T. (2012). Personal and family perfectionism of Taiwanese college students: Relationships with depression, self-esteem, achievement motivation, and academic grades. *International Journal of Psychology, 47*(4), 305–314.*

Wickline, V. B. (2003). *Ethnic differences in the self-esteem/academic achievement relationship: A meta-analysis* (Unpublished doctoral dissertation). Emory University, Atlanta, GA.

Zuffianò, A., Alessandri, G., Gerbino, M., Kanacri, B. P. L., Di Giunta, L., Milioni, M., et al. (2013). Academic achievement: The unique contribution of self-efficacy beliefs in self-regulated learning beyond intelligence, personality traits, and self-esteem. *Learning and Individual Differences*, *23*, 158–162.*

Chapter 16
The Effect of Social Adjustment on Student Achievement

Engin Karadağ

16.1 Introduction

According to Alfred Adler, individuals have the ability to adapt, the ability to achieve important things and the ability to strive for more development (Gençtan 1984). Adjustment to the environment and the external conditions is a crucial issue for people who want to live a meaningful life together in a society. In this context, as social beings, humans establish various relationships with their environment during their lives and they adapt to the society which sustains them. It is a usual phenomenon that people try to establish a balance between individual characteristics, needs and expectations and the features, the requests and the expectations of society.

In spite of the main consensus among researchers, defining the concept of adjustment is difficult (Crede and Neihorster 2012; Feldt et al. 2011; Kline 2005). Baker and Siryk (1999) defined adjustment to college as the extent to which the student copes, "explicitly or implicitly," with the diverse demands related to the college experience (p. 1). Adjustment is a large construct that includes different domains (e.g., academic, social, institutional, attachment), each of which is expected to impact the tudent's overall adjustment to college (Baker and Siryk 1999).

16.1.1 *Social Adjustment*

Social adjustment is defined as "the degree to which children get along with their peers; the degree to which they engage in adaptive, competent social behavior; and

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the extent to which they inhibit aversive, incompetent behavior" (Crick and Dodge 1994, p. 82). It is also defined as the degree to which one achieves goals that are sanctioned by society, and it can be measured in terms of "social (e.g., peer status), emotional (e.g., self concept, others' global judgments), familial (e.g., make-up, degree of cohesion), and relational (e.g., quality of friendships, dating frequency) outcomes" (Cavell 1990, p. 118). It is also related to "social functioning and social status in the peer group" (Chen and Rubin 1997), the ability to maintain a satisfactory relationship with other people of different ages (especially with one's peers) and the ability to adjust in accordance with what is considered normal or average at a given age (Marcucci 1967). Moreover, social adjustment is defined as the ability to positively cope with social challenges, rules and moral expectations during growth and development (Osborne 2013). as an individual's ability to adapt to the social aspects of the college context (Baker and Siryk 1999; Engels et al. 2001) and as the extent to which the individual is able to integrate himself or herself in social networks and feel like she/he belongs within in a community (Crede and Neihorster 2012; Gerdes and Mallinckrodt 1994). It also refers to students' ability to cope with social demands that typically present themselves in college (e.g., finding new peer groups) (Baker and Siryk 1999) and to the sociocultural aspects of adjustment which includes the degree to which a student feels at home both in the dormitory and within the university community (Crede and Neihorster 2012). Finally, social adjustment focuses on individuals' competence in establishing friendships and relations and the ability to navigate social contexts in an adaptive manner (Engels et al. 2001). Overall, at the present moment there are a number of different definitions of social adjustment and it appears that this concept is defined in terms of both subjective (satisfaction with one's friends) and objective measures (acceptance by one's peers) (Cavell 1990; Crick and Dodge 1994).

16.1.2 Social Adjustment, Family and School

It is undeniable that the child's parents have a major impact on the child's social adjustment. For instance, children who grow up in democratic and concerned families have a higher level of adjustment than the children who grow up in families exhibiting authoritarian and careless attitudes. In addition, marital problems between parents such as conflicts, separation, poor communication and individuation are vital issues that affect the personal, social and academic adjustment (Gerdes and Mallinckrodt 1994).

Besides family, school is another important organization that contributes to children's adjustment to their environment and their socialization. By establishing and maintaining social relations at school, the child can learn to work and play with others and shortly adjust to live in a society (Yavuzer 2007). The children who engage in self-recognition can seek the suitable models in their environment and learn to socially adjust taking the various samples of social behavior as models.

Initially, the child imitates the behaviors of society's members, adopting the rules and behaviors in an almost automatic way.

The socially well-adjusted students are most likely to exhibit responsibility, maturity and dependability and to possess qualities that will prove beneficial in future endeavors. Someone who is socially adjusted would generally project his self as a positive social being who is capable of establishing interpersonal relationships and accepting social demands (APA 2007). Adjustment may be manifested as "personal or emotional problems and include global psychological distress, somatic distress, anxiety, low self-esteem, or depression" (Gerdes and Mallinckrodt 1994, p. 281). On the other hand, students' social isolation and maladjustment often lead to decision to drop out of school (Tinto 1993). The degree to which the emerging adult is able to adjust to the social context of school is likely to be determined and affected by the complex interplay of social and emotional factors. Specifically, the perceived attachment to parents, identity formation and social self-efficacy appear to play a role in adjustment. The possibility of developing poor social adjustment skills, including self-defeating behaviors, becomes more apparent during the later stages of development, as displayed, for example, through delinquency due to poor bond formation between parents and children during the early childhood (Kiesner et al. 2010). These students described their transition to school as "hard," "difficult," "a struggle" and they were "unhappy." They also reported that the school was less friendly and warm than they had anticipated and that the school falsely advertised its attempts to foster diversity.

There is some evidence in the literature that the social and academic adjustment of students are positively related to each other. Clark et al. (1985) state that reading and mathematics achievement scores were positively correlated with students' levels of social initiation, cooperation and peer reinforcement (Scott and Scott 1998). Additionally, several researchers argue that social adjustment can lead to academic achievement (Ray and Elliott 2006). Caprara et al. (2000) used the third-grade social behaviors of children to predict their eight-grade peer preferences and academic achievement. They argued that early prosocial behaviors, such as self-report, peer nominations and teacher rating, strongly predict later academic achievement even when controlling for third-grade academic achievement. The results of this study suggest that social skills are significantly linked with later academic achievement.

Since prior researche has found that social adjustment has a relation with academic achievement (Caprara et al. 2000; Burden 1972; Carlson 1969; Gariglietti 1999; Loudon 1961; Makay 1980; McCulty 2009), it is important to examine the pathways through which social adjustment influences academic achievement. In the context of the above background, this research aims to investigate the relationship between social adjustment and academic achievement with the help of meta-analysis.

This study looked at the effect of social adjustment to student achievement. The moderator variables are the following: (i) the year of the studies, (ii) the courses and the (iii) sample group. All these variables, along with the results of previous studies, were used to test the following hypotheses of this study:

H_1 Social adjustment has a positive effect on student achievement.
H_2 Sample group is a moderator for the positive effect of social adjustment on student achievement.
H_3 The course is a moderator for the positive effect of social adjustment on student achievement.
H_4 The year of the studies is a moderator for the positive effect of social adjustment on student achievement.

16.2 Method

16.2.1 Study Design

In this study the effect of social adjustment on student achievement was tested with a meta-analysis design.

16.2.2 Review Strategy and Criteria for Inclusion/Exclusion

To determine the research studies to include in the meta-analysis, the Science-Direct, Proquest and Ebsco academic databases were used to conduct a literature review. For this process, the terms social adjustment and student achievement/student success included in the titles of the studies were used to screen the research studies. The end date for the research studies included in the research was identified as January 2016. Doctoral dissertations and peer-reviewed journals were included in the study.

Many strategies were used to identify the research studies that were appropriate for the meta-analysis of the study. First, a research study pool (48 research studies) was established; it included all studies with social adjustment and student achievement/success in their titles. The abstracts of these studies were reviewed, and all were found to be appropriate to include in the study. In the second stage, all research studies in the pool were examined in detail. The results of the examination found that 24 of the research studies in the pool were appropriate, and 24 were not found to be suitable. The descriptive statistics of the 24 research studies included in the analysis are presented in Table 16.1.

The criteria for inclusion of the research studies in the analysis study were identified as follows:

- To have the statistical information necessary for correlational meta-analysis (n and r, or R^2 values)
- To be a study measuring the correlation school culture and student achievement/ success

Table 16.1 Characteristics of the studies included in the meta-analysis

Options		1	2	3	4	5	6	Total
Type of publication		Thesis	Article					–
	n	24	–					24
	%	100	–					100
Sample group		3–8th grade students	9–12th grade students	University students				
	n	21	2	1				24
	%	88	8	4				100

Reasons for not including a research study in the meta-analysis:

- Having no quantitative data (qualitative research)
- Not having a correlation coefficient
- Not focusing on student achievement
- Not focusing on social adjustment

16.2.3 Coding Process

The coding process was essentially a data sorting process used to ascertain which data were clear and suitable for the study. In this scope, a coding form was developed before the statistical analysis was conducted, and the coding was conducted according to the form. The main aim was to develop a specific coding system that allowed the study to see the entirety of the research studies in general and that would not miss any characteristics of each individual research study. The coding form developed in the study was comprised of:

- References for the research
- Sample information
- Sample group
- The courses,
- The years of the studies
- Data collection tool(s)
- Quantitative values

16.2.4 Statistical Processes

The effect size acquired in meta-analysis is a standard measure value used in the determination of the strength and direction of the relationship in the study (Borenstein et al. 2009). Pearson's correlation coefficient (r) was determined to be the effect size in this study. Because the correlation coefficient has a value between +1 and −1, the r value calculated was evaluated by converting this value into the value as it appears in the z table (Hedges and Olkin 1985). Provided that more than one correlation value is given between the same structure categories in correlational meta-analysis studies, two different approaches are used in the determination of the one to be used in the meta-analysis (Borenstein et al. 2009; Kulinskaya et al. 2008). For this study, (*i*) first, if the correlations were independent, all the related correlations were included in the analysis and were considered to be independent studies, and (*ii*) if there were dependent correlations, then the highest correlation value was accepted. A random effect model was used for the meta-analysis processes in this study. The Comprehensive Meta-Analysis program was used in the meta-analysis process.

16.2.5 Moderator Variables

To determine the statistical significance of the differences between the moderators of the study, only the Q_b values were used. Three moderator variables that were expected to have a role in the average effect size were identified in the study. The first of these considered is the years of the studies as a moderator in regards to the relationship between social adjustment and student achievement. The second is the sample group which was thought to have a role on the average impact of s social adjustment on student achievement. The last is the courses which assessed for the student achievement.

16.2.6 Publication Bias

A funnel plot for the research studies included in the meta-analysis of can be seen in Fig. 16.1. Evidence that publication bias affected the research studies included in the meta-analysis can be seen in Fig. 16.1. A serious asymmetry would be expected in the funnel plot if there were a publication bias. The concentration of plots on one side under the line of average effect size, particularly in the bottom section of the funnel, suggests the probability of a publication bias in the research studies. In this study, no evidence of partially of the publications was observed in any of the 24 data subjected to meta- analysis.

Although no partiality in publications was observed in the funnel plot, the results of Duval and Tweedie's trim and fill test, which was applied to determine the effect of partiality in publications acquired with the meta-analysis using the random effect model, are given in Table 16.2. As is seen in Table 16.2, there is no difference between the effect observed and the artificial effect size created to fix the effect of the partiality of publications. The research on each side of the center line is symmetrical, and this is the indicator of non-difference. Because there is no evidence

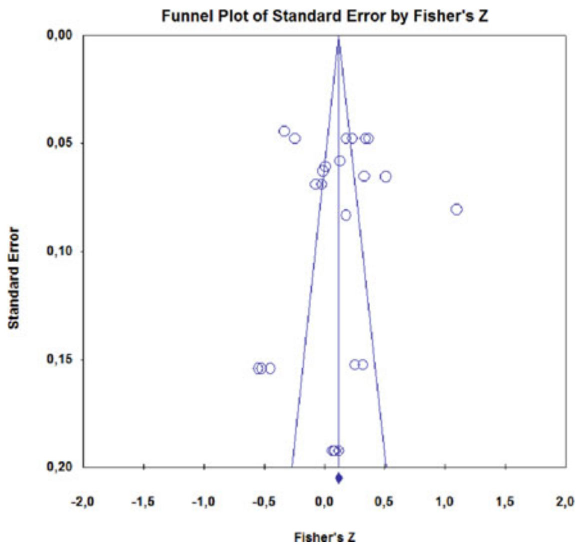

Fig. 16.1 Effect size funnel for publication bias

Table 16.2 Duval and Tweedie's trim and fill test results

	Excluded studies	Point estimate	CI (confidence interval)		Q
			Lower limit	Upper limit	
Observed values		0,12	0,09	0,15	482,13
Corrected values	0	0,12	0,09	0,15	482,13

indicating lost data on either side of the center line, the difference between the fixed effect size and observed effect size is zero.

16.3 Findings

Table 16.3 shows the results of the meta-analysis regarding the effect of social adjustment on student achievement. The findings disconfirm hypothesis H_1 which predicted that there would be a positive relationship between social adjustment and student achievement.

According to the findings, the difference in the level of effect of the various years of publication is statistically significant ($Q_b = 9.36$, $p < .05$). In particular, the effect of social adjustment on student achievement is at a high level in the studies published before 1990 [$r = .15$] and between 1990 and 1999 [$r = .57$], while it is at a low level in the studies published between 2000 and 2009 [$r = .13$] and after 2010 [$r = -.22$].

Table 16.3 The correlation between social adjustment and student achievement: meta-analysis results

Variables		k	N	*r*	CI (confidence interval)		Q	Q_b
					Lower limit	Upper limit		
Social adjustment		24	5096	.10	−.04	.23	482.13	
Moderator [courses]								**1.86**
GPA		9	1917	.13*	.08	.17		
Language		1	442	.33*	.24	.41		
Math		5	775	.19*	.12	.26		
Reading		8	1520	−.03	−.08	.02		
Science		1	442	.23*	.14	.31		
Moderator [publication year]								
Before 1990		19	3728	.15*	.11	.18		**9.36***
1990–1999		2	303	.57*	.49	.64		
2000–2009		1	299	.13*	.02	.24		
After 2009		2	766	−.22*	−.28	−.15		
Moderator [education level/sample group]								
K8		21	4268	.11	−.05	.25		**.12**
K12		2	572	.07	−.38	.49		
University		1	256	−.01	−.59	.57		

$^*p < .05$

Secondly, although the difference in the effect level of the courses examined is not statistically significant ($Q_b = 1.86$, $p > .05$), the grade point average [$r = .13$], language [$r = .33$], mathematics [$r = .19$] and science [$r = .23$] courses had a low level effect on student achievement.

Finally, the moderator analysis showed that the difference in the effect level of the education levels examined is not statistically significant ($Q_b = .12$, $p > .05$).

16.4 Conclusion

This meta-analysis study examined a total of 24 studies (with 5096 participants) to investigate whether there is a statistically important relation between social adjustment and student achievement and if so to measure its effect size. In the context of this research objective, a number of articles, theses and dissertations were scanned and surveyed. Furthermore, this study examined whether variables such as the course, year of publication and the grade-level are playing a moderator role in the effect of social adjustment on student achievement. In the literature there are some studies which show that there is a significant positive relationship between social adjustment and student achievement (Burden 1972; Gariglietti 1999;

Loudon 1961; Makay 1980; McCulty 2009; Seilhamer 1983; Tallon 1985) as well as some studies which state that there is a significant negative relationship between them (Carlson 1969; Duong 2011; Merilus 2015; Rankin 1968). This research has, however, found that social adjustment has no effect on student achievement. In fact, a statistically significant impact of social adjustment on student achievement is to be expected just because social adjustment and its components have a critical role for students in the classroom. Students who are socially well-adjusted may study hard and learn easily in the class.

The moderator analysis shows that the moderator variables of this study had no impact on the effect of social adjustment on student achievement with the exception of the year of publication. Firstly, no significant differences were found in the effect levels of the of the various courses. However, GPA [r = .13] and the courses of language [r = .33], mathematics [r = .19] and science [r = .23] have a low level effect on the relationship between social adjustment and student achievement. Similarly, concerning the education level (sample group) of the students, the difference in the effect levels of the grade-levels examined is not statistically significant. Finally, it can be stated that only the publication year is a moderator on the relationship between social adjustment and student achievement.

This meta-analysis study is important because it shows the need for an in-depth investigation of the relationship between social adjustment and student achievement. Therefore, further qualitative and comparative meta-analysis studies should be conducted in order to investigate this relationship.

References

American Psychiatric Association. (2007). *APA dictionary of psychology*. Washington, DC.

Baker, R. W., & Siryk, B. (1999). *SACQ: Student adaptation to college questionnaire manual*. Second Printing. Los Angeles, CA: Western Psychological Services.

Borenstein, M., Hedges, L. V., Higgins, J., & Rothstein, H. R. (2009). *Introduction to meta analysis*. John Willey & Sons, Ltd.

Burden, M. (1972). *The efficacy of special class placement for the educable mentally retarded as indicated by measures of academic achievement and social adjustment* (Unpublished master's thesis). Memorial University of Newfoundland, Canada.

Caprara, G. V., Barbaranelli, C., Pastorelli, C., Bandura, A., & Zimbardo, P. G. (2000). Prosocial foundations of children's academic achievement. *Psyhological Science, 11*(4), 302–307.

Carlson, G. F. (1969). *Achievement and adjustment patterns of educable mentally handicapped boys using a social learning theory framework* (Unpublished doctoral dissertation). Graduate Division of Wayne State University, Detroit, Michigan.

Cavell, T. A. (1990). Social adjustment, social performance, and social skills: A tricomponent model of social competence. *Journal of Clinical Child Psychology, 19,* 111–122.

Chen, X., & Rubin, K. (1997). Relation between academic achievement and social adjustment: Evidence from Chinese children. *Developmental Psychology, 33*(3), 518–525.

Clark, L., Gresham, F. M., & Elliott, S. N. (1985). Development and validation of a social skills assessment measure: The tross-c. *Journal of Psychoeducational Assessment, 3*(4), 347–356.

Crede, M., & Neihorster, S. (2012). Adjustment to college as measured by the student adaptation to college questionnaire: A quantitative review of its structure and relationships with correlates and consequences. *Educational Psychology Review, 24,* 133–165.

Crick, N. R., & Dodge, K. A. (1994). A review and reformulation of social information processing mechanisms in children's social adjustment. *Psychological Bulletin, 115,* 74–101.

Duong, M. T. (2011). *Associations between social adjustment and academic achievement among Mexican American and Vietnamese American early adolescents* (Unpublished doctoral dissertation). University of Southern California, USA.

Engels, R. C. M. E., Finkenauer, C., Meeus, W., & Dekovic, M. (2001). Parental attachment and adolescents' emotional adjustment: The associations with social skills and relational competence. *Journal of Counseling Psychology, 48,* 428–439.

Feldt, R. C., Graham, M., & Dew, D. (2011). Measuring adjustment to college: Construct validity of the student adaptation to college questionnaire. *Measurement and Evaluation in Counseling and Development, 44,* 92–104.

Gariglietti, K. P. (1999). *The role of hope in the social adjustment and academic success of Hispanic immigrant children* (Unpublished doctoral dissertation). University of Kansas, USA.

Gençtan, E. (1984). *Psikalaniz ve sonrası*. İstanbul: Maya Yayınları.

Gerdes, H., & Mallinckrodt, B. (1994). Emotional, social, and academic adjustment of college students: A longitudinal study of retention. *Journal of Counseling & Development, 72,* 281–288.

Hedges, L., & Olkin, I. (1985). *Statistical models for meta-analysis*. New York: Academic Press.

Kiesner, J., Poulin, F., & Dishion, T. J. (2010). Adolescent substance use with friends: Moderating and mediating effects of parental monitoring and peer activity contexts. *Merrill-Palmer, 56,* 529–556.

Kline, T. J. B. (2005). *Psychological testing: A practical approach to design and evaluation*. Thousand Oaks, CA: SAGE.

Kulinskaya, E., Morgenthaler, S., & Staudte, R. G. (2008). *Meta analysis: A guide to calibrating and combining statistical evidence* (Vol. 756). John Wiley & Sons.

Loudon, M. L. (1961). *The interrelationships op children's interests, achievement, and social adjustment* (Unpublished doctoral dissertation). Louisiana State University, USA.

Makay, M. E. M. (1980). *A study of self-concept, socıal adjustment, career awareness and academıc achıevement of fourth grade students* (Unpublished doctoral dissertation). The Ohio State University, USA.

Marcucci, E. M. (1967). *The use of the Chicago adjustment rating scale and behavior check list in determining the social adjustment and behavior of educable mentally retarded children in intermediate special classes in the new haven public schools* (Unpublished master's thesis). Southern Connecticut State Collage, USA.

McCulty, K. C. (2009). *Predictors of academic achievement, social adjustment, and intention to persist: A bio ecological analysis of college retention* (Unpublished doctoral dissertation). University of Florida, USA.

Merilus, H. A. (2015). *First year international students' interpersonal relations, external experiences, knowledge of immigration procedures, academic achievement, social-cultural adjustment, and their willingness to stay in the united states after they complete their education* (Unpublished doctoral dissertation). Dowling College, New York, USA.

Osborne, J. (2013). *A comparison of social adjustment between children in home school and alternative education placements*. Unpublished doctoral dissertation. Alliant International University, California, USA.

Rankin, C. I. (1968). *The achievement, personal adjustment, and social adjustment op black, elementary school students undergoing forced busing in Wichita, Kansas* (Unpublished doctoral dissertation). Kansas State University, Kansas, USA.

Ray, C. E., & Elliott, S. N. (2006). Social adjustment and academic achievement: A predictive model for students with diverse academic and behavior competencies. *School Psychology Review, 35*(3), 493–501.

Scott, R., & Scott, W. A. (1998). *Adjustment and adolescents, cross-cultural similarities and differences*. New York: Routledge.

Seilhamer, E. S. (1983). *The effects of type of migration on reading achievement in Spanish, physical (somatic) adjustment, school adjustment, and social adjustment on a group of Puerto Rican students* (Unpublished doctoral dissertation). The Pennsylvania State University, USA.

Tallon, M. S. (1985). *An investigation of the relationship between selected characteristics of families of educable mentally retarded children and the long term academic success and social adjustment of these children* (Unpublished doctoral dissertation). Temple University, USA.

Tinto, V. (1993). *Leaving college: Rethinking the causes and cures of student attrition* (2nd ed.). Chicago, IL: The University of Chicago Press.

Yavuzer, H. (2007). *Çocuk psikolojisi*. İstanbul: Remzi Kitabevi.

Chapter 17
The Effect of Parent Involvement on Student Achievement

Şahin Danişman

17.1 Introduction

Families and schools are important partners in the education of children and they share the responsibility for children's achievement, and this requires the collaboration between parents and schools (Epstein 2010). Originating from this necessity, the concept of parent involvement refers to a wide range of activities and connections among schools, families and communities (Sheldon and Epstein 2005).

The inclusion of parents as partners in the education of children has arguably many advantages (Pena 2000). One of the advantages brought through parental involevement is the enhancement of student achievement (Jeynes 2003; Rameriz 2001; Wehlburg 1996). Furthermore, the parents who are involved in their children's education are likely to develop high educational aspirations for them (Cai et al. 1997). Students may benefit both academically and in terms of their development when their parents are engaged with and involved in their education (Garcia 2014). As Garcia (2014) elaborates, regarding their education, these students tend to have higher grades, test scores, school attendance, graduation rates, homework readiness and educational aspirations. Concerning their development, these students may have higher motivation, better self-esteem, a high level of self-efficacy, positive attitudes, decreased use of drugs/alcohol and fewer occurrences of violent behavior.

In the literature, parental involvement models have been developed by Epstein (2010), Grolnick and Slowiaczek (1994) and Hoge et al. (1997). Although there are some significant differences among these models they also overlap to some extent. For example, one common point is the concern with parental involvement in

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connection with students' academic life rather than with their behavior or with other outcomes (Kugler 2009). We will elaborate on Epstein's model which is widely used in the relevant literature.

Through her research Epstein (2010) has developed a multidimensional framework of six different types of family involvement. Epstein et al. (2009) have stated that the purpose of the "Six Types of Involvement" model is to improve schools' collaboration and partnership with the families of students, increasing thus students' achievement. To put it in another way, the primary objective of this framework is to help schools engage with parents in order the latter to become partners in their children's education (Epstein and Hollifield 1996). The six types of parental involvement are examined and explained below (Epstein and Salinas 2004):

Type 1 [Parenting]: Assist families with parenting skills, family support, understanding child and adolescent development and setting home conditions to support learning at each age and grade level. Assist schools in understanding families' backgrounds, cultures and goals for children.

Type 2 [Communicating]: Communicate with families about school programs and student progress. Create two-way communication channels between school and home.

Type 3 [Volunteering]: Improve the recruitment, training, activities and schedules of volunteers in order to involve families as volunteers and as audiences at the school or in other locations. Enable educators to work with the volunteers who support students and the school.

Type 4 [Learning at Home]: Encourage families to get involved with their children in academic learning at home, including homework, goal setting and other curriculum-related activities. Encourage teachers to design homework that enables students to share and discuss interesting tasks.

Type 5 [Decision Making]: Include families as participants in school decisions, governance and advocacy activities through school councils or through improvement teams, committees and parent organizations.

Type 6 [Collaborating with the community]: Link the resources and services for families, students and the school with community groups, including businesses, agencies, cultural and civic organizations and colleges or universities. Enable all the relevant actors to offer services to the community.

This framework can also be used both at home and at school as a tool to enhance the achievement of children and to inform both educators and parents about how to achieve this purpose (Epstein 2010). To make the different types of parental involvement more understandable and clear, Table 17.1, which has been adapted from the work of Epstein (2010, p. 85), presents the definition and sample practices for each type of parental involvement.

Parental involvement as well as parental expectations and styles may affect children's educational attainments (Pearce 2006). Parental involvement in education influences student achievement since any social and cultural gaps between the school and home may result in poor academic achievement (Comer 1980). Given the importance of parental involvement, schools have to increase the level of

Table 17.1 Epstein's framework of six types of involvement and sample practices

Types	Definition	Sample practices	
Parenting	Help all families to establish supporting home environments for students	Suggestions for home conditions that support learning at each grade level	Home visits at transition points (when moving to preschool, elementary, middle and high school)
Communicating	Design effective forms of school-to-home and home-to-school communication about school programs and children's progress	Conferences with every parent at least once a year, with follow-ups as needed	Weekly or monthly folders of student work sent home for review and comments
Volunteering	Recruit and organize parent help and support	Parent room or family center for volunteer work, meetings and resources for families	Classes with parents, telephone tree, or other structures to provide all families with needed information
Learning at home	Provide information and ideas to families about how to help students at home with homework and other curriculum-related activities, decisions and planning	Information for families on skills required for students in all subjects at each grade	Information on homework policies and how to monitor and discuss school-work at home
Decision making	Include parents in school decisions, developing parent leaders and representatives	Independent advocacy groups to lobby and work for school reform and improvements	District-level councils and committees for family and community involvement
Collaborating with the community	Identify and integrate resources and services from the community to strengthen school programs, family practices and student learning and development	Information on community activities related to learning skills and talents, including summer programs for students	Service to the community by students, families and schools (e.g., recycling, art, music)

parental inclusion into the schooling of children (Davies 2002). The educational level of parents may be another additional factor affecting the parents' involvement in their child's education (Becker and Epstein 1982). Likewise, Dauber and Epstein (1993) concluded that the parents who are more educated have higher levels of involvement in their children's education than the less educated ones. Although both teachers and parents may share the belief that parent involvement is quite important for the child's development, the absence of parent involvement may result from a number different family factors, such as lack of time, energy and economic resources, lack of knowledge and failure to understand the role parents can play, as well as from various school factors such as poor reporting practices or hostility toward parents (Eccles and Harold 1993).

Taking into account the fact that there are a number of different studies on the relationship between parent involvement and student achievement, this study aimed to test the following hypotheses bringing together the results from previous research:

$\mathbf{H_1}$ Parent involvement has a positive effect on student achievement.
$\mathbf{H_2}$ Publication type is a moderator for the positive effect of parent involvement on student achievement.
$\mathbf{H_3}$ Sample group (education level) is a moderator for the positive effect of parent involvement on student achievement.
$\mathbf{H_4}$ School subject or assessment type is a moderator for the positive effect of parent involvement on student achievement.
$\mathbf{H_5}$ Country (culture) is a moderator for the positive effect of parent involvement on student achievement.
$\mathbf{H_6}$ The year of the studies is a moderator for the positive effect of parent involvement on student achievement.

17.2 Method

17.2.1 Study Design

In this study, the effect of parent involvement on student achievement was tested with a meta-analysis design.

17.2.2 Review Strategy and Criteria for Inclusion/Exclusion

To determine the research studies to include in the meta-analysis, the Science-Direct, Proquest and Ebsco academic databases were used to conduct a literature review. For this process, the terms *involvement* and *achievement/success* included in the titles of the studies were used to screen the research studies. The start and end dates for the research studies included in the research were identified as 2005 and February 2016. Doctoral dissertations and peer-reviewed journals were included in the study.

Many strategies were used to identify the research studies that were appropriate for the meta-analysis of the study. First, a research study pool (1640 research studies) was established; it included all studies with involvement and achievement/success in their titles. The abstracts of these studies were reviewed, and all were found to be appropriate to include in the study. In the second stage, all research studies in the pool were examined in detail. The results of the examination found that 119 of the research studies in the pool were appropriate, and 1521 were not found to be suitable. The descriptive statistics of the 251 correlation coefficients obtained from 119 research studies included in the analysis are presented in Table 17.2.

The criteria for inclusion of the research studies in the analysis study were identified as follows:

- To have the statistical information necessary for correlational meta-analysis (n and r, or R^2 values)
- To be a study measuring the correlation between parent involvement and student achievement/success

Reasons for not including a research study in the meta-analysis:

- Having no quantitative data (qualitative research)
- Not having a correlation coefficient
- Not focusing on student achievement
- Not focusing on parent involvement

17.2.3 Coding Process

The coding process was essentially a data sorting process used to ascertain which data were clear and suitable for the study. In this scope, a coding form was developed before the statistical analysis was conducted, and the coding was conducted according to the form. The main aim was to develop a specific coding system that allowed the study to see the entirety of the research studies in general and that would not miss any characteristics of each individual research study. The coding form developed in the study was comprised of:

- References for the research,
- Sample information,
- Type of publication,
- Sample group,
- School subject or assessment type,
- Country,
- The years of the studies,
- Data collection tool(s),
- Quantitative values.

Table 17.2 Characteristics of the studies included in the meta-analysis

Variables		1	2	3	4	5	6	7	Total
Type of publication		Thesis/dissertation	Article						–
	n	117	134						251
	%	47	53						100
Sample group/unit		Preschool	Elementary school	Middle school	High school	University	Mixed		
	n	37	86	48	44	3	33		251
	%	15	34	19	18	1	13		100
School subject		Language	Mathematics	Science	Other	Mixed			
	n	89	77	14	3	68			251
	%	35	31	6	1	27			100
Country		Vertical-collectivist	Horizontal-individualist						
	n	40	211						251
	%	16	84						100
Publication year		2005–2008	2009–2012	2013–2016					
	n	65	98	88					251
	%	26	39	35					100

17.2.4 Statistical Processes

The effect size acquired in meta-analysis is a standard measure value used in the determination of the strength and direction of the relationship in the study (Borenstein et al. 2009). Pearson's correlation coefficient (r) was determined to be the effect size in this study. Because the correlation coefficient has a value between *+1* and *−1,* the *r* value calculated was evaluated by converting this value into the value as it appears in the *z* table (Hedges and Olkin 1985). Provided that more than one correlation value is given between the same structure categories in correlational meta-analysis studies, two different approaches are used in the determination of the one to be used in the meta-analysis (Borenstein et al. 2009; Kulinskaya et al. 2008). For this study, (*i*) first, if the correlations were independent, all the related correlations were included in the analysis and were considered to be independent studies, and (*ii*) if there were dependent correlations, then the *highest correlation value* was accepted. A *random effect model* was used for the meta-analysis processes in this study. The *Comprehensive Meta-Analysis* program was used in the meta-analysis process.

17.2.5 Moderator Variables

To determine the statistical significance of the differences between the moderators of the study, only the Q_b values were used. Five moderator variables that were expected to have a role in the average effect size were identified in the study. The first of these considered is the *type of publication* as a moderator in regards to the relationship between parent involvement and student achievement. The second is the *sample group* which was thought to have a role on the average impact of parent involvement on student achievement. The rest are the *school subject/assessment type, country*, and *years of the studies*.

17.2.6 Publication Bias

A funnel plot for the research studies included in the meta-analysis of can be seen in Fig. 17.1. Evidence that publication bias affected the research studies included in the meta-analysis can be seen in Fig. 17.1. A serious asymmetry would be expected in the funnel plot if there were a publication bias. The concentration of plots on one side under the line of average effect size, particularly in the bottom section of the funnel, suggests the probability of a publication bias in the research studies. In this study, no evidence of partiality of the publications was observed in any of the 251 data subjected to meta-analysis.

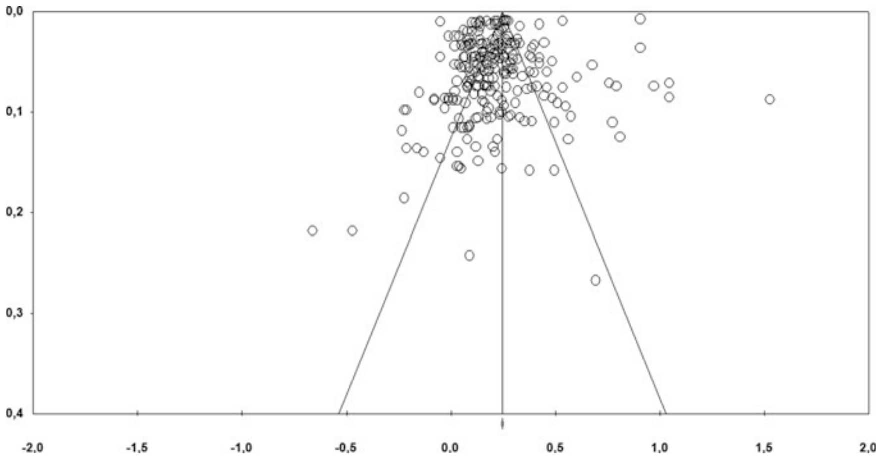

Fig. 17.1 Effect size funnel for publication bias

Table 17.3 Duval and Tweedie's trim and fill test results

	Excluded studies	Point estimate	CI (confidence interval)		*Q*
			Lower limit	Upper limit	
Observed values		.21	.19	.24	14849,7405
Adjusted values	0	.21	.19	.24	14849,7405

Although no partiality in publications was observed in the funnel plot, the results of Duval and Tweedie's trim and fill test, which was applied to determine the effect of partiality in publications acquired with the meta-analysis using the random effect model, are given in Table 17.3. As seen in Table 17.3, there is no difference between the effect observed and the artificial effect size created to fix the effect of the partiality of publications. The research on each side of the center line is symmetrical, and this is the indicator of non-difference. Because there is no evidence indicating lost data on either side of the center line, the difference between the fixed effect size and observed effect size is zero.

17.3 Findings

Table 17.4 shows the results of the meta-analysis which examined the relationship between student achievement and parent involvement. The findings supported hypothesis H_1 which argues that there is a positive relationship between student achievement and parent involvement. The effect size of parent involvement on

Table 17.4 Findings regarding the relationship between student achievement and parent involvement: meta-analysis results

Variable	k	N	*r*	CI (confidence interval)		*Q*	Q_b
				Lower limit	Upper limit		
Parent involvement	251	378,069	.21*	.19	.24	**14849.741***	
Moderator [type of publication]							**0.285**
Thesis and dissertation	117	115,189	.22*	.18	.26		
Article	134	262,880	.21*	.17	.24		
Moderator [sample group]							**7.950**
Preschool	37	82,518	.15*	.09	.21		
Elementary school	86	76,700	.24*	.20	.28		
Middle school	48	68,208	.23*	.17	.28		
High school	44	107,698	.22*	.17	.28		
University	3	417	.09	−.14	.30		
Mixed	33	42,528	.22*	.15	.28		
Moderator [school subject/assessment type]							**2.500**
Language	89	115,772	.21*	.17	.25		
Mathematics	77	126,033	.24*	.19	.28		
Science	14	74,142	.18*	.08	.28		
Other	3	2,157	.12	−.11	.33		
Mixed	68	59,965	.20*	.16	.25		
Moderator [country]							**7.383***
Vertical-collectivist	40	11,560	.29*	.23	.35		
Horizontal-individualist	211	366,509	.20*	.17	.23		
Moderator [year of publication]							**3.322**
2005–2008	65	90,771	.25*	.20	.29		
2009–2012	98	100,334	.22*	.18	.26		
2013–2016	88	186,964	.19*	.15	.23		

*$p < .01$, **$p < .05$

student achievement was calculated to be .21. This value shows that parent involvement has a low level effect (*see* Cohen 1988) on student achievement.

The results of the moderator analysis showed that hypothesis H_2 regarding the moderator role of publication type on the level of effect of parent involvement on student achievement is not confirmed. The level of effect of publication type on student achievement was not found to be significant (Q_b = 0.285, p > .05) in the moderator analysis conducted through a random effects model. In particular, the publication types included in the meta-analysis have a low level significant effect on student achievement (thesis/dissertation [r = .22] and article [r = .21]). The effect sizes of these two publication types are almost the same.

The findings did not also provide support for hypothesis H_3 which stated that the sample group (education level) plays a moderator role on the level of effect that parent involvement has on student achievement. Although the moderator analysis did not find a statistically significant difference between the levels of effect of the sample groups examined (Q_b = 7.950, p > .05), the level of effect of parent involvement on student achievement is statistically significant and low for pre-school, [r = .15], elementary school [r = .24], middle school [r = .23], high school [r = .22] and for mixed groups [r = .22] while it is not significant for university [r = .09].

Similarly, the moderator analysis disconfirmed hypothesis H_4 which stated that school subject is a moderator variable for the effect of parent involvement on student achievement. There is no statistically significant difference in the level of effect of the school subjects analyzed (Q_b = 2.500, p > .05). In particular, the level of effect of parent involvement on student achievement is statistically significant and low for language [r = .21], mathematics [r = .24], science [r = .18] and general achievement [r = .20], whereas the moderator role of other subjects [r = .12] was not found to be significant.

The findings supported hypothesis H_5 which stated that the country (culture) plays a moderator role for the effect of parent involvement on student achievement. The moderator analysis showed that the difference between the level of effect of studies from different countries was statistically significant (Q_b = 7.383, p < .05). In particular, it was found that vertical-collectivist [r = .29] and horizontal-individualist [r = .20] countries had a low level effect on student achievement. The countries with the highest level of effect were found to be the vertical-collectivist ones.

This research did not find any support for hypothesis H_6 which hypothesized that publication year plays a moderator role in the effect of parent involvement on student achievement. The moderator analysis did not reveal a statistically significant difference in the level of effect of the different publication years of the research studies examined (Q_b = 3.322, p > .05). In particular, it was found that publication year has a low level effect on student achievement with regard to the publications dated between 2005 and 2008 [r = .25], between 2009 and 2012 [r = .22] and between 2013 and 2016 [r = .19].

17.4 Conclusion

A total of 119 research studies (with 378,069 participants) published between 2005 and 2016 were included in this meta-analysis study aiming to examine the magnitude of the effect size of parent involvement on student achievement. The type of publication, the sample group (education level), the school subject or assessment type, the country (culture) in which the research was carried out and the year in which the study was published were considered as moderator variables. The results of the meta-analysis showed that there is a low level positive effect of parent involvement on student performance. This finding is similar with the results of the meta-analysis studies conducted by Fan and Chen (2001) and Hill and Tyson (2009) while the meta-analysis studies conducted by Jeynes (2007, 2012) and by Jeynes (2005) and Sénéchal and Young (2008) found medium effect sizes and large effect sizes respectively regarding the relationship between parent involvement and student achievement. Another meta-analytic study by Jeynes (2003) showed that the effect sizes changed from low to large for different sample groups and achievement measures.

According to the results of the moderator variable analysis, the country from which the study samples were chosen has been found to play a moderator role in the effect of parental involvement on student achievement. The sample groups chosen from vertical-collectivist countries showed a higher level of effect than the sample groups from the horizontal-individualist countries. This may be the result of the properties of each group of countries in that the people from vertical-collectivist countries focus on enhancing the cohesion and status of their in-groups while the people from horizontal-individualist countries tend to focus on their uniqueness and self-reliance (Shavitt et al. 2011). Triandis and Gelfand (1998) define the concept of vertical collectivism as seeing the self as a part of a community (sample scale items: "Parents and children must stay together as much as possible"), while horizontal individualism is defined as seeing the self as fully autonomous (sample scale item: "I often do 'my own thing'."). Although the conducted meta-analysis studies about the effect of parental involvement on student achievement did not include this particular distinction of countries, these studies have used the variable of ethnicity or race as the moderator for the same effect. In particular, Fan and Chen (2001) have found that ethnicity showed relatively small moderating effect on the relationship between parental involvement and students' academic achievement. At the same time, Hill and Tyson (2009) concluded that the effect size of the different ethnicities was similar.

Regarding the other moderator variables such as the type of publication, sample group, school subject and the publication year of the studies, these yielded no statistically significant results for the effect of parental involvement on student achievement. In other words, these variables do not play a moderator role for the relationship between parental involvement and academic achievement of the students, since the effect size levels of these variables have quite similar average correlation coefficients. Fan and Chen (2001) has, however, concluded that the area of academic achievement, which we have called in this study as "school subject", has a strong moderating effect on the correlation coefficients between parental involvement and students' academic achievement. Our moderator analysis findings suggest that the effect sizes according to the subgroups of publication type, sample group, school subject and publication year do not differ from each other, hence we can conclude that the studies conducted yielded similar results for these kinds of variables. Moreover, the obtained effect sizes for the subgroups of publication type, sample group and school subject were higher than those found by Castro et al. (2015). Regarding, however, the various sample groups (education levels), our study has similar findings with the studies conducted by Castro et al. (2015) and Jeynes (2012) in that the primary and secondary education levels have the largest effect size. Although there are similar meta-analysis studies addressing the same issue with the present study, it is difficult to compare this research with these studies since the latter have included different moderator variables or they have used different statistical measures such as a *t* test. Additionally, Castro et al. (2015) suggested that some paradoxical results found in most of the analyzed studies can be explained by the complex nature of the construct 'parental involvement'.

A general conclusion to be deduced from this research is that parent involvement is important for children's education. In sum, the findings concerning the effect of parental involvement on student achievement/success/performance are presented below:

- Parental involvement has a low level positive effect on student achievement [$r = .21$],
- Country has been found to be a moderator variable for the relationship between parental involvement and student achievement, while the variables of publication type, sample group, school subject and publication year do not have a moderator role in this relationship.

Eccles and Harold (1993) have stated that the collaborative relationship between parents and schools seems to decrease rather than increase as children move through higher educational levels. Parents are important for children's school performance, especially during the first years of schooling, since at that stage children are more dependent on their parents and need guidance. Accordingly, the level of parent involvement in children's education may influence the educational life of children. It is recommended by this study to conduct furthet comparative and comprehensive meta-analysis studies using different moderator variables with the aim of examining the relationship between parental involvement and student achievement.

References

Note. "*" References marked with an asterisk indicate studies included in the meta–analysis. The in–text citations to studies selected for meta–analysis are not followed by asterisks.

Abd-El-Fattah, S. M. (2006). Effects of family background and parental involvement on Egyptian adolescents; academic achievement and school disengagement: A structural equation modelling analysis. *Social Psychology of Education, 9*(2), 139–157.*

Abd-El-Fattah, S. M. (2006). The relationship among Egyptian adolescents' perception of parental involvement, academic achievement, and achievement goals: A mediational analysis. *International Education Journal, 7*(4), 499–509.*

Abenavoli, R. M., Greenberg, M. T., & Bierman, K. L. (2015). For learning at school entry: Benefits for aggressive children in high-risk urban contexts. *Early Childhood Research Quarterly, 31*, 9–18.*

Alghazo, Y. (2014). *Cross-cultural study of socioeconomic status, parental involvement, and students' mathematics achievement* (Doctoral dissertation). Southern Illinois University at Carbondale, ProQuest Dissertations Publishing, (UMI Number: 3640660).*

Aligbe, E. (2014). *Parental involvement behaviors and mathematics achievement among suburban high school students* (Doctoral dissertation). Walden University, ProQuest Dissertations Publishing, (UMI Number: 3621531).*

Altschul, I. (2011). Parental involvement and the academic achievement of Mexican American youths: What kinds of involvement in youths' education matter most? *Social Work Research, 35*(3), 159–170.*

Ayers, T. H. (2010). *The relationship between stress, academic confidence, parental involvement, and academic achievement in African American urban youth* (Doctoral dissertation). Fielding Graduate University, ProQuest Dissertations Publishing, (UMI Number: 3397529).*

Baker, C. E. (2015). Does parent involvement and neighborhood quality matter for african american boys' kindergarten mathematics achievement? *Early Education & Development, 26* (3), 342–355.*

Bakker, J., Denessen, E., & Brus-Laeven, M. (2007). Socio-economic background, parental involvement and teacher perceptions of these in relation to pupil achievement. *Educational Studies, 33*(2), 177–192.*

Banerjee, M., Harrell, Z. A. & Johnson, D. J. (2011). Racial/ethnic socialization and parental involvement in education as predictors of cognitive ability and achievement in African American children. *Journal of Youth And Adolescence, 40*(5), 595–605.*

Barr, J. J. (2005). *Parent involvement in student learning: Do student achievement and parent trust matter?* (Doctoral dissertation). Michigan State University, ProQuest Dissertations Publishing, (UMI Number: 3189606).*

Bauman, H. A. (2011). *The relationship between academic achievement and economic level at selected high schools in western Pennsylvania and their impact on the degree and success of parental involvement strategies* (Doctoral dissertation). Duquesne University, ProQuest Dissertations Publishing, (UMI Number: 3481326).*

Beaumont, K. M. (2011). *Parent academic involvement and child academic achievement: The influence of parent-child language in Mexican-origin families* (Master's thesis). University of California, Davis, ProQuest Dissertations Publishing, (UMI Number: 1500011).*

Becker, H. J., & Epstein, J. L. (1982). Parent involvement: A survey of teacher practices. *The Elementary School Journal, 83*(2), 85–102.

Bertram, A. N. (2005). *The relationship of parent involvement and post-divorce adjustment to the academic achievement and achievement motivation of school-aged children* (Doctoral dissertation). Oklahoma State University, ProQuest Dissertations Publishing, (UMI Number: 3202872).*

Bevill, L. C. (2007). *The effect of parental involvement upon student achievement and student diligence: A study of students and parents in Grenada* (Doctoral dissertation). Tennessee State University, ProQuest Dissertations Publishing, (UMI Number: 3290732).*

Bieschke, J. G. (2013). *Parental involvement predictors of academic success: A review of the NCES 2007 Parent and Family Involvement in Education Survey* (Doctoral dissertation). Drake University, ProQuest Dissertations Publishing, (UMI Number: 3603032).*

Bitsoi, R. (2009). *The relationship between Navajo family structure and student achievement, student self-esteem and parental involvement* (Doctoral dissertation). Arizona State University, ProQuest Dissertations Publishing, (UMI Number: 3357254).*

Black, E. W. (2009). *An evaluation of familial involvements' influence on student achievement in K-12 virtual schooling* (Doctoral dissertation). University of Florida, ProQuest Dissertations Publishing, (UMI Number: 3367406).*

Bojuwoye, O., & Narain, M. (2008). Parental involvement and children's academic achievement in a South Africa setting. *Journal of Psychology in Africa, 18*(2), 275–278.*

Borenstein, M., Hedges, L. V., Higgins, J. P. T., & Rothstein, H. R. (2009). *Introduction to meta-analysis*. UK: Wiley.

Brennan, L. (2015). *Toddler-age externalizing behaviors and school-age academic achievement: Independent associations and the impact of parental involvement* (Master's thesis). University of Pittsburgh, ProQuest Dissertations Publishing, (UMI Number: 3735241).*

Brown, C. M. (2005). *Parent home involvement and student achievement for Mexican-American and European American students with learning disabilities* (Doctoral dissertation). University of California, Santa Barbara, ProQuest Dissertations Publishing, (UMI Number: 3178743).*

Burnett, R. A. (2010). *An investigation of parental involvement and its impact on academic achievement of middle school students in rural Georgia* (Doctoral dissertation). South Carolina State University, ProQuest Dissertations Publishing, (UMI Number: 3489190).*

Byfield, P. (2012). *Parental involvement and the academic achievement of African American students* (Doctoral dissertation). Walden University, ProQuest Dissertations Publishing, (UMI Number: 3498222).*

Cai, J., Moyer, J. C, & Wang, N. (1997). *Parental roles in students' learning of mathematics: An exploratory study*. Paper presented at the annual meeting of the American Educational Research Association, Chicago, IL.

Campbell, B. V. (2006). *Parental involvement as an explanation of mathematics and reading achievement in kindergartners* (Doctoral dissertation). North Carolina State University, ProQuest Dissertations Publishing, (UMI Number: 3233022).*

Castro, M., Exposito-Casas, E., Lopez-Martin, E., Lizasoain, L., Navarro-Asencio, E., & Gaviria, J. L. (2015). Parental involvement on student academic achievement: A meta-analysis. *Educational research review, 14*, 33–46.

Chavira, G. (2005). *Latino adolescents' academic achievement and identity formation: The roles of family involvement and students' goals* (Doctoral dissertation). University of California, Santa Cruz, ProQuest Dissertations Publishing, (UMI Number: 3187685).*

Cipriano, C. (2011). *Parent educational involvement and student achievement: Disentangling parent socialization and child evocative effects across development* (Doctoral dissertation). Boston College, ProQuest Dissertations Publishing, (UMI Number: 3449089).*

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Hillside, NJ: Lawrence Erlbaum Associates.

Colson, M. J. (2010). *The investigation of research-based home parental involvement practices, parental style, and student achievement* (Doctoral dissertation). Dowling College, ProQuest Dissertations Publishing, (UMI Number: 3424859).*

Comer, J. P. (1980). *School power: Implications of an intervention project*. New York: The Free Press.

Conant, A. (2013). *The relationship among parental involvement, learning, and academic achievement: A cultural perspective* (Doctoral dissertation). Florida Gulf Coast University, ProQuest Dissertations Publishing, (UMI Number: 3598492).*

Dabrusky, G. B. (2007). *A case study of the perceptions and practices of economically disadvantaged parents towards parental involvement and the relationship to student achievement in a suburban school district* (Doctoral dissertation). Dowling College, ProQuest Dissertations Publishing, (UMI Number: 3288341).*

Daniel, G. R., Wang, C., & Berthelsen, D. (2016). Early school-based parent involvement, children's self-regulated learning and academic achievement: An Australian longitudinal study. *Early Childhood Research Quarterly, 36*, 168–177.*

Dauber, S. L., & Epstein, J. L. (1993). Parents' attitudes and practices of involvement in inner city elementary and middle schools. In N. F. Chavkin (Ed.), *Families and schools in a pluralistic society* (pp. 53–71). Albany, NY: State University of New York Press.

Davies, D. (2002). The 10th school revisited: Are school/family/community partnerships on the reform agenda now? *Phi Delta Kappan, 83*(5), 388–392.

Davis, G. R. (2012). *Exploring the relationship between african american father involvement and the academic success of their college-age children* (Doctoral dissertation). Alliant International University, ProQuest Dissertations Publishing, (UMI Number: 3517357).*

Driessen, G., Smit, F., & Sleegers, P. (2005). Parental involvement and educational achievement. *British Educational Research Journal, 31*(4), 509–532.*

Dumont, H., Trautwein, U., Lüdtke, O., Neumann, M., Niggli, A., & Schnyder, I. (2012). Does parental homework involvement mediate the relationship between family background and educational outcomes? *Contemporary Educational Psychology, 37*, 55–69.*

Dunbar, A. S. (2012). *Exploring the academic achievement gap among children of immigrants: The role of parent involvement at home and school* (Master's Thesis). The University of North Carolina at Greensboro, ProQuest Dissertations Publishing, (UMI Number: 1541260).*

Ebuta, C. N., & Ekpo-Eloma, E. O. (2014). Influence of parental involvement on their children's education and their academic achievement in English language. *Global Journal of Educational Research, 13*(1), 31–36.*

Eccles, J., & Harold, R. (1993). Parent-school involvement during the early adolescent years. *Teachers College Record, 94*(3), 568–587.

Elum, L. L. (2011). *Parental involvement and its impact on the child's academic achievement in a small urban middle school* (Doctoral dissertation). University of Phoenix, ProQuest Dissertations Publishing, (UMI Number: 3531638).*

Epstein, J. L., & Hollifield, J. H. (1996). Title I and school-family-community partnerships: Using research to realize the potential. *Journal of Education for Students Placed at Risk, 1*(3), 263–278.

Epstein, J. L. (2010). School/family/community partnerships: Caring for the children we share. *Phi Delta Kappan, 92*(3), 81–96.

Epstein, J. L., & Salinas, K. (2004). Partnering with families and communities. *Educational Leadership, 61*(8), 12–18.

Epstein, J. L., Sanders, M. G., Sheldon, S., Simon, B. S., Salinas, K. C., Jansorn, N. R., et al. (2009). *School, family, and community partnerships: Your handbook for action* (3rd ed.). Thousand Oaks, CA: Corwin Press.

Fan, X., & Chen, M. (2001). Parental involvement and students' academic achievement: A meta-analysis. *Educational Psychology Review, 13*(1), 1–22.

Flouri, E., Tsivrikos, D., Akhtar, R., & Midouhas, E. (2015). Neighbourhood, school and family determinants of children's aspirations in primary school. *Journal of Vocational Behavior, 87*, 71–79.*

Garcia, J. N. (2014). *Teacher and parental beliefs and expectations of parental involvement and how it relates to student academic achievement* (Doctoral dissertation). Texas State University, Proquest Dissertation Publishing, (UMI Number: 3681031).

Gaston, S. M. (2013). *The relationship between principals' perceptions of parent involvement and student academic achievement in Title I schools* (Doctoral dissertation). Azusa Pacific University, ProQuest Dissertations Publishing, (UMI Number: 3606136).*

Gonida, E, N., & Cortina, K. S. (2014). Parental involvement in homework: relations with parent and student achievement-related motivational beliefs and achievement. *The British Journal of Educational Psychology, 84*, 376–396.*

Grolnick, W. S., & Slowiaczek, M. L. (1994). Parents involvement in children's schooling: A multidimensional conceptualization and motivational model. *Child Development, 65*(1), 237–252.

Hashmi, A., & Akhter, M. (2013). Assessing the parental involvement in schooling of children in public /private schools, and its impact on their achievement at elementary level. *Journal of Educational Research, 16*(1), 27–38.*

Hawes, C. A., & Plourde, L. A. (2005). Parental involvement and its influence on the reading achievement of 6th grade students. *Reading Improvement, 42*(1), 47–57.*

Hawkins, C. E. (2006). *The relationship of paternal involvement to students' self-concept, behaviors and academic achievement* (Doctoral dissertation). Cleveland State University, ProQuest Dissertations Publishing, (UMI Number: 3232050).*

Hayes, D. (2012). Parental involvement and achievement outcomes in African American adolescents. *Journal of Comparative Family Studies, 43*(4), 567–582.*

Hayes, D. M. (2005). *Parents' rating of involvement predict adolescents' achievement outcomes* (Doctoral dissertation). Tulane University, ProQuest Dissertations Publishing, (UMI Number: 3210864).*

Hedges, L. V. & Olkin, I. (1985). *Statistical method for meta-analysis*. United Kingdom: Academic Press.

Henry, D. B., Tolan, P. H., Gorman-Smith, D., & Schoeny, M. E. (2012). Risk and direct protective factors for youth violence results from the centers for disease control and prevention's multisite violence prevention project. *American Journal of Preventive Medicine, 43*(2), 67–75.*

Hernandez, A. V. (2007). *The effectiveness of parental involvement in the academic success of Latino students in middle school* (Doctoral dissertation). Alliant International University, Los Angeles, ProQuest Dissertations Publishing, (UMI Number: 3305631).*

Hill, N. E., & Tyson, D. F. (2009). Parental involvement in middle school: A meta-analytic assessment of the strategies that promote achievement. *Developmental Psychology, 45*(3), 740–763.

Hill, N. E., Castellino, D. R., Lansford, J. E., Nowlin, P., Dodge, K. A., Bates, J. E., et al. (2004). Parent academic involvement as related to school behavior, achievement, and aspirations: demographic variations across adolescence. *Child Development, 75*(5), 1491–1509.*

Hoge, D. R., Smit, E. K., & Crist, J. T. (1997). Four family processes factors predicting academic achievement in sixth and seventh grade. *Educational Research Quarterly, 21*(2), 27–42.

Hosseinpour, V., Yazdani, S., & Yarahmadi, M. (2015). The relationship between parents' involvement, attitude, educational background and level of income and their children's english achievement test scores. *Journal of Language Teaching & Research, 6*(6), 1370–1378.*

Howard, N. R. (2015). *The influences of mathematics self-efficacy, identity, interest, and parental involvement on STEM achievement in algebra for female high school students* (Doctoral dissertation). Chapman University, ProQuest Dissertations Publishing, (UMI Number: 3668930).*

Hughes, J. N., Gleason, K. A., & Zhang, D. (2005). Relationship influences on teachers' perceptions of academic competence in academically at-risk minority and majority first grade students. *Journal of School Psychology, 43*, 303–320.*

Jackson, W. A. (2011). *The relationship between parental involvement and student achievement in a rural Florida high school* (Doctoral dissertation). Northcentral University, ProQuest Dissertations Publishing, (UMI Number: 3480000).*

Jenkins-Stamper, R. L. (2009). *The relationship between parental involvement and student achievement among students in special education programs in Dougherty County, State of Georgia* (Doctoral dissertation). TUI University, ProQuest Dissertations Publishing, (UMI Number: 3357459).*

Jeynes, W. H. (2003). A meta-analysis: The effects of parental involvement on minority children's academic achievement. *Education and Urban Society, 35*(2), 202–218.

Jeynes, W. H. (2005). A meta-analysis of the relation of parental involvement to urban elementary school student academic achievement. *Urban Education, 40*(3), 237–269.

Jeynes, W. H. (2007). The relationship between parental involvement and urban secondary school student academic achievement. A meta-analysis. *Urban Education, 42*(1), 82–110.

Jeynes, W. H. (2012). A meta-analysis of the efficacy of different types of parental involvement programs for urban students. *Urban Education, 47*(4), 706–742.

Johnson, U. Y. (2011). *Parent involvement and science achievement: A latent growth curve analysis* (Doctoral dissertation). University of North Texas, ProQuest Dissertations Publishing, (UMI Number: 3506976).*

Johnson, U. Y., & Hull, D. M. (2014). Parent involvement and science achievement: A cross-classified multilevel latent growth curve analysis. *Journal of Educational Research, 107* (5), 399–409.*

Kaplan Toren, N. (2013). Multiple dimensions of parental involvement and its links to young adolescent self-evaluation and academic achievement. *Psychology in the Schools, 50*(6), 634–649.*

Karbach, J., Gottschling, J., Spengler, M., Hegewald, K., & Spinath, F. M. (2013). Parental involvement and general cognitive ability as predictors of domain-specific academic achievement in early adolescence. *Learning and Instruction, 23*, 43–51.*

Kirby, M. M. (2006). *The advantages of parental involvement in closing the achievement gap* (Doctoral dissertation). Capella University, ProQuest Dissertations Publishing, (UMI Number: 3229511).*

Kramer, K. Z. (2012). Parental behavioural control and academic achievement: Striking the balance between control and involvement. *Research in Education, 88*, 85–98.*

Kugler, T. (2009). *The relationship of parental involvement to student academic achievement in Latino middle school students* (Doctoral dissertation). University of Southern California, ProQuest Dissertations Publishing, (UMI Number: 3368583).*

Kulinskaya, E., Morgenthaler, S., & Staudte, R. G. (2008). *Meta-analysis: A guide to calibrating and combining statistical evidence*. London: Wiley.

Kuperminc, G. P., Darnell, A. J., & Alvarez-Jimenez, A. (2008). Parent involvement in the academic adjustment of Latino middle and high school youth: Teacher expectations and school belonging as mediators. *Journal of Adolescence, 31*, 469–483.*

Kusterer, K. D. (2010). *Impact of parenting styles on academic achievement: Parenting styles, parental involvement, personality factors and peer orientation* (Doctoral dissertation). Long Island University, The Brooklyn Center, ProQuest Dissertations Publishing, (UMI Number: 3356956).*

Lee, J. S., & Bowen, N. K. (2006). Parent involvement, cultural capital, and the achievement gap among elementary school children. *American Educational Research Journal, 43*(2), 193–218.*

Lee, J. Y. (2012). *The relationship between perceptions of self-efficacy, classroom practices, parental involvement, and student achievement among low income African American middle school students* (Doctoral dissertation). Howard University, ProQuest Dissertations Publishing, (UMI Number: 3513484).*

Lee, S. H. (2012). *Parental influence on children's achievement from Korea: Types of involvement, attributions, education, and income* (Doctoral dissertation). The University of Arizona, ProQuest Dissertations Publishing, (UMI Number: 3526443).*

Lozano, C. (2015). *Perceived parental involvement and cultural orientation as predictors of academic achievement in Mexican American high school students* (Doctoral dissertation). Alliant International University, ProQuest Dissertations Publishing, (UMI Number: 3735210).*

Lyman, J. (2014). *Impact of parental involvement and poverty on academic achievement* (Master's thesis). Miami University, ProQuest Dissertations Publishing, (UMI Number: 3670827).*

Marrero, C. (2007). *Immigration status, parental involvement, and educational achievement among Puerto Ricans* (Doctoral dissertation). St. John's University (New York), ProQuest Dissertations Publishing, (UMI Number: 3340560).*

McBride, B. A., Schoppe-Sullivan, S. J., & Ho, M.-H. (2005). The mediating role of fathers' school involvement on student achievement. *Journal of Applied Developmental Psychology, 26*, 201–216.*

McLaughlin, M. D. (2006). *An analysis of the relationship between parental involvement and student achievement in Rhode Island elementary schools* (Doctoral dissertation). Johnson & Wales University, ProQuest Dissertations Publishing, (UMI Number: 3234455).*

McNeal, R. B. (2014). Parent involvement, academic achievement and the role of student attitudes and behaviors as mediators. *Universal Journal of Educational Research, 2*(8), 564–576.*

Meza, C. C. (2012). *The relationship between family involvement and academic achievement and school behaviors among Latino families* (Master's thesis). California State University, Long Beach, ProQuest Dissertations Publishing, (UMI Number: 1517535).*

Midraj, J., & Midraj, S. (2011). Parental involvement and grade four students' English reading achievement. *International Journal of Applied Educational Studies, 12*(1), 41–56.*

Milot, G. A. (2005). *The relationship between parental involvement and religion academic achievement of students in the Catholic elementary schools in the Diocese of Fall River* (Doctoral dissertation). Seton Hall University, ProQuest Dissertations Publishing, (UMI Number: 3213964).*

Mombourquette, C. P. (2007). *A study of the relationship between the type of parent involvement and high school student engagement, academic achievement, attendance, and attitude toward school* (Doctoral dissertation). University of Montana, ProQuest Dissertations Publishing, (UMI Number: 3258724).*

Moreira, P. A. S., Dias, P., Vaz, F. M., & Vaz, J. M. (2013). Predictors of academic performance and school engagement—Integrating persistence, motivation and study skills perspectives using person-centered and variable-centered approaches. *Learning and Individual Differences, 24,* 117–125.*

Nellums, M. W. (2011). *A comparative study of parental involvement and its effect on African-American male and overall student achievement at single gender and coeducational middle schools* (Doctoral dissertation). University of Arkansas at Little Rock, ProQuest Dissertations Publishing, (UMI Number: 3481383).*

Niia, A., Almqvist, L., Brunnberg, E., & Granlund, M. (2015). Student participation and parental involvement in relation to academic achievement. *Scandinavian Journal of Educational Research, 59*(3), 297–315.*

Norman, S. U. (2005). *Parental involvement: An effective strategy for secondary alternative discipline schools' student achievement and compulsory student attendance* (Doctoral dissertation). Sam Houston State University, ProQuest Dissertations Publishing, (UMI Number: 3190118).*

Núñez, J., Suárez, N., Rosário, P., Vallejo, G., Valle, A., & Epstein, J. (2015). Relationships between perceived parental involvement in homework, student homework behaviors, and academic achievement: differences among elementary, junior high, and high school students. *Metacognition & Learning, 10*(3), 375–406.*

Olatoye, R. A., & Agbatogun, A. O. (2009). Parental involvement as a correlate of pupils' achievement in mathematics and science in Ogun State, Nigeria. *Educational Research and Reviews, 4*(10), 457–464.*

Oyerinde, B. A. (2014). *Correlating parental involvement and mathematics achievement of african american eighth-grade students* (Doctoral dissertation). Walden University, ProQuest Dissertations Publishing, (UMI Number: 3620303).*

Oyserman, D., Brickman, D., & Rhodes, M. (2007). School success, possible selves, and parent school involvement. *Family Relations, 56*(5), 479–489.*

Padavick, J. F. (2009). *Parental involvement with learning and increased student achievement* (Doctoral dissertation). Walden University, ProQuest Dissertations Publishing, (UMI Number: 3366815).*

Pangeni, K. P. (2014). Factors determining educational quality: Student mathematics achievement in Nepal. *International Journal of Educational Development, 34,* 30–41.*

Parry, D. L. (2010). *Narrowing the academic achievement gap among high school Latino students through parental involvement* (Doctoral dissertation). Walden University, ProQuest Dissertations Publishing, (UMI Number: 3409493).*

Patton, D. U., Woolley, M. E., & Hong, J. S. (2012). Exposure to violence, student fear, and low academic achievement: African American males in the critical transition to high school. *Children and Youth Services Review, 34*, 388–395.*

Pearce, R. R. (2006). Effects of cultural and social structural factors on the achievement of White and Chinese students at school transition points. *American Educational Research Journal, 43* (1), 75–101.

Pena, D. C. (2000). Parent involvement: Influencing factors and implications. *The Journal of Educational Research, 94*(1), 42–54.

Phillipson, S., & Phillipson, S. N. (2007). Academic expectations, belief of ability, and involvement by parents as predictors of child achievement: A cross-cultural comparison. *Educational Psychology, 27*(3), 329–348.*

Pruitt, T. R. (2012). *Identifying types of parental involvement that most effectively support academic achievement* (Doctoral dissertation). Walden University, ProQuest Dissertations Publishing, (UMI Number: 3519097).*

Raju, P. M., & Asfaw, A. (2009). Recalled test anxiety in relation to achievement, in the context of general academic self-concept, study habits, parental involvement and socio-economic status among Grade 6 Ethiopian students. *Education 3–13, 37*(3), 269-285.*

Rameriz, A. (2001). Parent involvement is like apple pie: A look at parental involvement in two states. *High School Journal, 85*(1), 1–9.

Rogers, M. A., Theule, J., Ryan, B. A., Adams, G. R., & Keating, L. (2009). Parental involvement and children's school achievement: Evidence for mediating processes. *Canadian Journal of School Psychology, 24*(1), 34–57.*

Sad, N. (2012). Investigation of parental involvement tasks as predictors of primary students' Turkish, math, and science & technology achievement. *Eurasian Journal of Educational Research, 49,* 173–196.*

Scott, M. (2007). *Effects of home-school partnership and different forms of parent involvement on achievement of high achieving elementary school students* (Doctoral dissertation). South Carolina State University, ProQuest Dissertations Publishing, (UMI Number: 3361414).*

Sénéchal, M., & Young, L. (2008). The effect of family literacy interventions on children's acquisition of reading from kindergarten to grade 3: A meta-analytic review. *Review of Educational Research, 78*(4), 880–907.

Sha, L., Looi, C.-K., Chen, W., Seow, P., & Wong, L.-H. (2012). Recognizing and measuring self-regulated learning in a mobile learning environment. *Computers in Human Behavior, 28*, 718–728.*

Shavitt, S., Johnson, T. P., & Zhang, J. (2011). Horizontal and vertical cultural differences in the content of advertising appeals. *Journal of International Consumer Marketing, 23*(3–4), 297–310.

Sheldon, S. B., & Epstein, J. L. (2005). Involvement counts: Family and community partnerships and mathematics achievement. *Journal of Educational Research, 98*(4), 196–206.*

Sibley, E., & Dearing, E. (2014). Family educational involvement and child achievement in early elementary school for American-born and immigrant families. *Psychology in the Schools, 51* (8), 814–831.*

Snyder-Hogan, L. E. (2010). *The role of parental involvement in the academic achievement of Latino youth* (Doctoral dissertation). Temple University, ProQuest Dissertations Publishing, (UMI Number: 3408718).*

Stanford, D. (2014). *The extent of parental involvement as it relates to third-grade reading success in low-income schools* (Doctoral dissertation). Capella University, ProQuest Dissertations Publishing, (UMI Number: 3670412).*

Stephens, Y. P. (2010). *The impact of parental involvement on achievement at the third grade level* (Doctoral dissertation). Capella University, ProQuest Dissertations Publishing, (UMI Number: 3390689).*

Strambler, M. J., Linke, L. H., & Ward, N. L. (2013). Academic identification as a mediator of the relationship between parental socialization and academic achievement. *Contemporary Educational Psychology, 38*, 99–106.*

Su, W. (2012). *Explaining the link between parental educational expectations and Chinese high school students' academic achievement: The roles of psychological distress, parental involvement, and filial piety* (Doctoral dissertation). The University of Alabama at Birmingham, ProQuest Dissertations Publishing, (UMI Number: 3512324).*

Sultana, A. M., & Rosli, N. B. (2016). Parental involvement on students' learning abilities and achievement in the English subject. *International Journal of Social Science and Humanity, 6* (2), 103–106.*

Tan, E. T., & Goldberg, W. A. (2009). Parental school involvement in relation to children's grades and adaptation to school. *Journal of Applied Developmental Psychology, 30*, 442–453.*

Tang, S. (2012). *Family educational involvement and social capital: Potential pathways to educational success for students of immigrant families* (Doctoral dissertation). Boston College, ProQuest Dissertations Publishing, (UMI Number: 3521728).*

Triandis, H. C., & Gelfand, M. J. (1998). Converging measurement of horizontal and vertical individualism and collectivism. *Journal of Personality and Social Psychology, 74*(1), 118–128.

Underwood, J. J. (2011). *The role of cultural capital and parental involvement in educational achievement and implications for public policy* (Master's thesis). East Carolina University, ProQuest Dissertations Publishing, (UMI Number: 1505424).*

Villiger, C., Wandeler, C., & Niggli, A. (2014). Explaining differences in reading motivation between immigrant and native students: The role of parental involvement. *International Journal of Educational Research, 64*, 12–25.*

Voltaire, M. (2005). *Parental involvement: Its relation to achievement in a multiethnic sample of newly immigrated students* (Doctoral dissertation). Florida International University, ProQuest Dissertations Publishing, (UMI Number: 3206038).*

Wang, M. T., & Sheikh-Khalil, S. (2014). Does parental involvement matter for student achievement and mental health in high school? *Child Development, 85*(2), 610–625.*

Wang, X. (2009). *Maternal education, maternal language acculturation, parental involvement, and maternal social support as predictors of the academic achievement and socioemotional development of Asian American children* (Doctoral dissertation). University of Maryland, College Park, ProQuest Dissertations Publishing, (UMI Number: 3359757).*

Wang, Y. (2015). A trend study of the influences of parental expectation, parental involvement, and self-efficacy on the English academic achievement of Chinese eighth graders. *International Education, 44*(2), 45–68.*

Washington, T., Cryer-Coupet, Q. R., Coakley, T. M., Labban, J., Gleeson, J. P., & Shears, J. (2014). Examining maternal and paternal involvement as promotive factors of competence in African American children in informal kinship care. *Children and Youth Services Review, 44*, 9–15.*

Wehlburg, C. (1996). The future of high school: The importance of parent involvement programs. *The High School Journal, 79*(2), 125–128.

Wenfan, Y., & Qiuyun, L. (2005). Parent involvement and mathematics achievement: Contrast across racial and ethnic groups. *Journal of Educational Research, 99*(2), 116–127.*

Wickery, J. M. (2010). *The association between participation in extracurricular activities and achievement in children and adolescents: Effects of parental involvement, self-esteem, and school belonging* (Doctoral dissertation). Northern Illinois University, ProQuest Dissertations Publishing, (UMI Number: 3439637).*

Wilkins, D. L. (2006). *The effect of community type, parent trust and parent involvement in schools on academic achievement* (Doctoral dissertation). Oklahoma State University, ProQuest Dissertations Publishing, (UMI Number: 3245778).*

Williams, L. D. (2010). *The impact of parental involvement on the literacy achievement of low-income pre-kindergarten students* (Doctoral dissertation). The University of North Carolina at Charlotte, ProQuest Dissertations Publishing, (UMI Number: 3439280).*

Wilson, B. R. (2009). *A correlational study: Parental involvement to student achievement in public education* (Doctoral dissertation). Lindenwood University, ProQuest Dissertations Publishing, (UMI Number: 3390655).*

Xu, M., Kushner Benson, S. N., Mudrey-Camino, R., & Steiner, R. P. (2010). The relationship between parental involvement, self-regulated learning, and reading achievement of fifth graders: A path analysis using the ECLS-K database. *Social Psychology of Education: An International Journal, 13*(2), 237–269.*

Yeo, K. L. (2007). *Mothers' involvement and children's achievement and conduct in Singapore primary schools* (Doctoral dissertation). Indiana University, ProQuest Dissertations Publishing, (UMI Number: 3277957).*

Yock, S. H. Y. (2014). *The relationship between parental involvement and 12th grade math achievement* (Master's thesis). State University of New York at Buffalo, ProQuest Dissertations Publishing, (UMI Number: 1561683).*

Zhao, J., & Wang, M. (2014). Mothers' academic involvement and children's achievement: Children's theory of intelligence as a mediator. *Learning and Individual Differences, 35*, 130–136.*

Chapter 18
The Effect of Goal Orientation on Student Achievement

Mustafa Güler

18.1 Introduction

> There are three things to remember about education. The first one is motivation. The second one is motivation. The third one is motivation.
>
> -Terrell Bell (cited in Maehr and Meyer 1997, p. 372)

Many variables affect the process of reaching education goals. While some of those variables are environmental (Higgins et al. 2005), others are affective ones such as beliefs (Ernest 1989), attitudes (Ma 1997) and motivation (Elliot 1999). The environmental factors which are mostly independent from the individual include variables such as classroom, teacher quality and classroom size, while the affective factors include the perspectives of the individuals towards teaching and learning activities, perceptions of success and the enjoyment from various the endeavors.

All the factors mentioned above are crucial because of their relationship with individuals' achievement either directly or indirectly. Apart from the effects of these factors on achievement, a recent trend in the literature has been to seek the relationship between goal orientation and academic achievement (e.g. Chen and Wong 2015a; Johnson 2012; Weidinger et al. 2016). Many theories in the field of cognitive studies, such as the cognitive development theory of Vygotsky (1980), focus on the cognitive activities which develop understanding and the learning of individuals. Goal orientation theory differs from these theories, and it focuses on the affective domain since it is related with the motivation that guides understanding rather than with the cognitive processes which affect or shape understanding. According to this theory, in order to predict the behavior of an individual who has different motivations the psychological processes of this individual should be

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investigated (Park et al. 2016). Goal orientation examines the reasons or aims behind individuals' behavior (Midgley et al. 1998), it deals with the goals that can bring success and it seeks to find the reasons for which these goals are preferred (Kaplan and Maehr 2007).

Goal orientation is rooted on the theory of Atkinson (1964, as cited in Cellar et al. 2011) which deals with achievement motivation and focuses on the joint influence of motivation to achieving success and avoiding failure. According to goal orientation theory introduced by Dweck (1986), motivation can be guided through performance goals and mastery goals. Button et al. (1996) have also classified goal orientations into two categories: mastery goal and performance goal. Mastery goal orientation is related to learning new things and gaining new skills during the learning process. Mastery goal orientation which is one of the intrinsic motivation sources and is related with the desire of the person is also linked with productivity (Brophy 2005). Students with such goals are aware of the development of proficiency through time and know the importance of effort in achieving proficiency. On the other hand, performance goal orientation is mostly related with factors such as teachers, friends, the environment and family. Performance goal orientation which represents the extrinsic motivation sources of the person (Anderman and Johnston 1998) includes the efforts to satisfy the teachers, friends and the family as well as trying to perform more than anybody else in society in order to feel a valuable individual.

Although the early goal theorists divided goal orientations into two dimensions, some recent researchers have established models with three factors (e.g. VandeWalle 1997) or four factors (Elliot and McGregor 2001). In the four-factor model of goal orientation, the variables of mastery and performance are crossed with the variables of approach and avoid, and the result is a 2×2 framework of goal achievement. Students with mastery-approach goal orientations, mostly prioritize the activities which increase their proficiency level while focusing on their own development. Being aware of self-development is a priority for these students (Brophy 2005). Students with mastery avoidance orientation are the ones who stay away from mislearning and sometimes reject to learn (Pintrich 2000). While students with performance approach participate in tasks in order to prove themselves more successful than others, performance avoidance is related to students who try to stay away from negative critics and to play-act that they are learned (Elliot and McGregor, 2001; Pintrich 2000). These kinds of goals are linked to anxiety, hopelessness and shame (Pekrun et al. 2006). Elliot and McGregor (2001) have established a goal orientation framework as given in Fig. 18.1.

Some examples of this model are given below:

Mastery approach: The goal of Mustafa is to become a successful student in mathematics class, because he loves mathematics.
Mastery avoidance: The goal of Maside is to avoid having any misconceptions during the instructions.
Performance approach: The goal of Buket is to prove to herself and to her family and teachers that she is the most successful student in the class.

		Definition	
		Absolute/intrapersonal (mastery)	Normative (performance)
Valence	Positive (approaching success)	Mastery-approach goal	Performance-approach goal
	Negative (avoiding failure)	Mastery-avoidance goal	Performance-avoidance goal

Fig. 18.1 The 2 × 2 goal orientation framework (Elliot and McGregor 2001, p. 502)

Performance avoid: The goal of Onur is to avoid being seen as inadequate in biology class.

In the literature, a series of studies examined the relation between goal orientation and academic achievement (e.g. Meissel and Rubie-Davies 2016; Wu 2006; Yeo and Neal 2004). It is expected to have a positive correlation between academic achievement and the approach-orientations, while a low correlation is expected for avoidance orientations. This is because students with avoidance orientations, for instance those who have mastery-avoidance goals, may tend to prefer easy materials or courses. At the same time, students with performance-avoidance goals may hesitate to ask questions and participate in class discussions because they have not learned the discussed subjects well.

The current study examined the effect of goal orientation on student achievement. Furthermore, the moderators that were expected to have a medium effect in this study were identified as follows: (*i*) year of publication, (*ii*) type of publication, (*iii*) country (culture), (*iv*) school subject/assessment type and (*v*) sample group/unit (education level). All these variables, along with the results of previous studies, were used to test the following hypotheses of this study:

H_1 Goal orientation has a positive effect on student achievement.
H_2 Publication type is a moderator for the positive effect of goal orientation on student achievement.
H_3 Sample group is a moderator for the positive effect of goal orientation on student achievement.
H_4 School subject or assessment type is a moderator for the positive effect of goal orientation on student achievement.
H_5 Country is a moderator for the positive effect of goal orientation on student achievement.
H_6 The year of the studies is a moderator for the positive effect of goal orientation on student achievement.

18.2 Method

18.2.1 Study Design

In this study, the effect of goal orientation on student achievement was tested with a meta-analysis design.

18.2.2 Review Strategy and Criteria for Inclusion/Exclusion

To determine the research studies to include in the meta-analysis, the Science-Direct, Proquest and Ebsco academic databases were used to conduct a literature review. For this process, the terms goal orientation and student achievement/student success included in the titles of the studies were used to screen the research studies. The end date for the research studies included in the research was identified as January 2016. Doctoral dissertations and peer-reviewed journals were included in the study.

Many strategies were used to identify the research studies that were appropriate for the meta-analysis of the study. First, a research study pool (426 research studies) was established; it included all studies with goal orientation and student achievement/success in their titles. The abstracts of these studies were reviewed, and all were found to be appropriate to include in the study. In the second stage, all research studies in the pool were examined in detail. The results of the examination found that 154 correlation values belong to 106 different research studies in the pool were appropriate, and the rest was not found to be suitable. The descriptive statistics of the 154 correlation values included in the analysis are presented in Table 18.1.

The criteria for inclusion of the research studies in the analysis study were identified as follows:

- To have the statistical information necessary for correlational meta-analysis (n and r, or R^2 values)
- To be a study measuring the correlation goal orientation and student achievement/success.

Reasons for not including a research study in the meta-analysis:

- Having no quantitative data (qualitative research)
- Not having a correlation coefficient
- Not focusing on student achievement
- Not focusing on goal orientation

Table 18.1 Characteristics of the studies included in the meta-analysis

Options		1	2	3	4	5	6	Total
Type of publication		Thesis/Dissertation	Article					–
	n	37	117					154
	%	24	76					100
Sample group/unit		Elementary school	Middle school	High school	University	Mixed		
	n	17	29	31	76	1		154
	%	11	18.8	20.1	49.4	0.7		100
School subject/Assessment type		Computer	Language	Mathematics	Psychology	Other	Mixed	
	n	9	10	35	10	26	64	154
	%	5.8	6.5	22.7	6.5	16.9	41.6	100
Country		Vertical-collectivist	Horizontal-individualist					
	n	17	137					154
	%	11	89					100
Publication year		…–2000	2001–2005	2006–2010	2011–2016			
	n	21	32	34	67			154
	%	13.6	20.8	22.1	43.5			100

18.2.3 Coding Process

The process was essentially a data sorting process used to ascertain which data were clear and suitable for the study. In this scope, a coding form was developed before the statistical analysis was conducted, and the coding was conducted according to the form. The main aim was to develop a specific coding system that allowed the study to see the entirety of the research studies in general and that would not miss any characteristics of each individual research study. The coding form developed in the study was comprised of:

- References for the research,
- Sample information,
- Type of publication,
- Sample group/unit,
- School subject or assessment type,
- Country,
- The years of the studies,
- Data collection tool(s),
- Quantitative values.

18.2.4 Statistical Processes

The size acquired in meta-analysis is a standard measure value used in the determination of the strength and direction of the relationship in the study (Borenstein et al. 2009). Pearson's correlation coefficient (r) was determined to be the effect size in this study. Because the correlation coefficient has a value between +1 and −1, the r value calculated was evaluated by converting this value into the value as it appears in the z table (Hedges and Olkin 1985). Provided that more than one correlation value is given between the same structure categories in correlational meta-analysis studies, two different approaches are used in the determination of the one to be used in the meta-analysis (Borenstein et al. 2009; Kulinskaya et al. 2008). For this study, (*i*) first, if the correlations were independent, all the related correlations were included in the analysis and were considered to be independent studies, and (*ii*) if there were dependent correlations, then the *highest correlation value* was accepted. A *random effect model* was used for the meta-analysis processes in this study. The *Comprehensive Meta-Analysis* program was used in the meta-analysis process.

18.2.5 Moderator Variables

To determine the statistical significance of the differences between the moderators of the study, only the Q_b values were used. Five moderator variables that were expected to have a role in the average effect size were identified in the study. The first of these considered is the *type of publication* as a moderator in regards to the relationship between goal orientation and student achievement. The second is the *sample group* which was thought to have a role on the average impact of goal orientation on student achievement. The rest are the *school subject/assessment type, country*, and *years of the studies*.

18.2.6 Publication Bias

A funnel plot for the research studies included in the meta-analysis of can be seen in Fig. 18.2. Evidence that publication bias affected the research studies included in the meta-analysis can be seen in Fig. 18.2. A serious asymmetry would be expected in the funnel plot if there were a publication bias. The concentration of plots on one side under the line of average effect size, particularly in the bottom section of the funnel, suggests the probability of a publication bias in the research studies. Evidence for publication bias was observed for the 154 correlation values included in the meta-analysis study.

A publication bias was observed in the funnel plot, and the results of Duval and Tweedie's trim and fill test, which was applied to determine the effect size related to partiality in the publications that was acquired with the meta-analysis using the

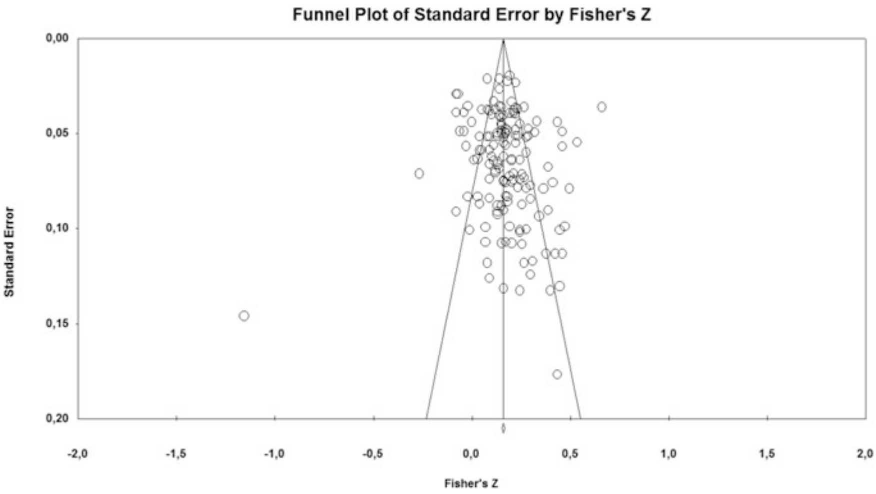

Fig. 18.2 Effect size funnel for publication bias

Table 18.2 Duval and Tweedie's trim and fill test results

	Excluded studies	Point estimate	CI (Confidence interval)		*Q*
			Lower limit	Upper limit	
Observed values		.17	.15	.19	1077.29726
Adjusted values	38	.12	.10	.14	1856.85663

random effect model, are shown in. As seen in Table 18.2, there is a difference between the observed effect size and the virtual effect size established to correct the effect of the publication bias. The reason for the difference is the asymmetry of the concentration on both sides of the center line and the studies plotted to the left of and above the center line, skewing the symmetry.

18.3 Findings

Table 18.3 shows the results of meta-analysis between student achievement and goal orientation. The findings supported H_1 which argues that there is a positive relationship between student achievement and goal orientation. The effect size of goal orientation on student achievement was calculated to be .17. This value shows that goal orientation has a low level effect (see Cohen 1988) on student achievement.

Results of the moderator analysis showed that H_2 hypothesis regarding the moderator role of publication type on the level of effect of goal orientation on student achievement was not supported. The level of effect of publication type on student achievement was not found to be significant ($Q_b = 1.693$, $p > .05$) in the moderator analysis examined through random effects model. However, publication types included in the meta-analysis such as thesis/dissertation [$r = .15$] and article [$r = .18$] have a low level significant effect on student achievement. The effect sizes of these two publication types are almost the same.

The findings did not also provide support for hypothesis H_3, which the sample group plays a moderator role on the level of effect that goal orientation has on student achievement. Although the moderator analysis did not find a statistically significant difference between the levels of effect between the sample groups ($Q_b = 5.773$, $p > .05$), the level of effect of goal orientation on student achievement is statistically significant for elementary school [$r = .18$], middle school [$r = .13$], high school [$r = .17$], university [$r = .19$] and these effects have been seen to be of a low level, while it is not significant for mixed group [$r = .22$].

Moderator analyses resulted no support for H_4 asserting that school subject is a moderator variable for the effect of goal orientation on student achievement. There is no statistically significant difference in the level of effect for school subjects ($Q_b = 2.627$, $p > .05$). However the level of effect of goal orientation on student

Table 18.3 Findings regarding the relationship between student achievement and goal orientation: Meta-analysis results

Variable	k	N	r	CI (Confidence Interval)		Q	Q_b
				Lower limit	Upper limit		
Student achievement	154	61,191	.17*	.15	.19	1077.297*	
Moderator [Type of publication]							**1.693**
Thesis & Dissertation	37	12,278	.15*	.10	.19		
Article	117	48,913	.18*	.16	.21		
Moderator [sample group]							**5.773**
Elementary school	17	5,888	.18*	.12	.25		
Middle school	29	22,855	.13*	.08	.17		
High school	31	13,759	.17*	.12	.21		
University	76	18,354	.19*	.16	.23		
Mixed	1	335	.22	−.04	.45		
Moderator [School subject/Assessment type]							**2.627**
Computer	9	1,260	.20*	.10	.29		
Language	10	4,282	.18*	.10	.26		
Mathematics	35	20,293	.17*	.13	.22		
Psychology	10	2,298	.14*	.05	.23		
Other	26	4,228	.21*	.15	.26		
Mixed	64	28,830	.16*	.13	.20		
Moderator [Country]							**7.056***
Vertical-collectivist	17	4,020	.26*	.19	.32		
Horizontal-individualist	137	57,171	.16*	.14	.19		
Moderator [Year of publication]							**2.646**
…–2000	21	7,086	.14*	.08	.20		
2001–2005	32	10,570	.18*	.13	.23		
2006–2010	34	12,621	.20*	.15	.25		
2011–2016	67	30,914	.17*	.14	.20		

*$p < .01$
**$p < .05$

achievement is statistically significant for computer [$r = .20$], language [$r = .18$], mathematics [$r = .17$], psychology [$r = .14$], other [$r = .21$] and general achievement [$r = .16$].

Findings supported hypothesis H_5, that country played a moderator role in the effect goal orientation has on student achievement. The moderator analysis showed that the difference between the level of effect of countries was statistically significant ($Q_b = 7.056$, $p < .05$). In this scope, it was found in studies that vertical-collectivist [$r = .26$] and horizontal-individualist [$r = .16$] countries had a low level effect on student achievement. The countries with the highest level of effect were found to be the vertical-collectivist ones.

The research did not find support for H_6 where it was hypothesized that publication year plays a moderator role in goal orientation having an effect on student achievement. The moderator analysis did not reveal a statistically significant difference in the level of effect for publication year of the research studies ($Q_b = 2.646$, $p > .05$). On the other hand, it was found that publication year has a low level effect on student achievement in regard to publications dated before 2000 [$r = .14$], between 2001 and 2005 [$r = .18$], 2006 and 2010 [$r = .20$], and 2011 and 2016 [$r = .17$].

18.4 Conclusion

A total of 154 correlation values which were selected among 106 different studies were included in this meta-analysis aimed at investigating the relationship between goal orientation and academic achievement. Publication type, sample group, school subject/assessment type, country and year of the publication variables were considered as moderators in the current study.

The findings of the meta-analysis show that goal orientation has a low-level effect on student achievement. This result validated H_1, which argued that there would be a positive relationship between goal orientation and student achievement as it is reported by many other research outcomes (e.g. Bayless 2009; Bell and Kozlowski 2002; Cho 2011; Coutinho 2006; Duchesne et al. 2014; Eum and Rice 2011; Gutman 2006; Kitsantas et al. 2009). Thus, it was determined that goal orientation has a positive effect on student achievement. However, the level of mentioned effect was determined *low*. Although this conclusion seems to be unexpected, a meta-analysis study conducted by Carpenter in 2007 revealed similar results (Carpenter 2007). In spite of related studies extending last decade (see Table 18.3), obtained results show that the relation between goal orientation and student achievement has not changed in time.

In the context of moderators, only *country* was found to be a moderator variable. This result is in parallel with the study carried out by Meissel and Rubie-Davies (2016). That is to say, they found that the people who have different cultural backgrounds have different goal orientations. Additionally, there was no significant relationship between publication type, sample group, school subject/assessment type and year of the publication, and student achievement. On that sense, it can be inferred that there is a consistency throughout type of publication. On the other hand, some studies in literature concluded that for any lesson (such as mathematics) positive (e.g. Mägi et al. 2010) or negative (e.g. Peng 2007) relation may be seen between goal orientation and academic achievement. The results obtained in the current meta-analysis study demonstrate that school subject/assessment type is not a significant moderator. Considering time period, the studies which investigate relation between goal orientation and academic achievement appear to be increasing over the years. However, year of publication remain as a consistent variable rather than a moderator.

To sum up, the results of the effect of goal orientation on student achievement is summarized as below:

- Goal orientation has a low-level positive effect on student achievement $[r = .17]$
- The hypotheses H_1 and H_5 were validated while the others were not. In other words, moderator variables of publication type, sample group, school subject/ assessment type and year of the publication do not moderate the effect of goal orientation on student achievement, but country variable has been found as a moderator.

References

Note. "*" References marked with an asterisk indicate studies included in the meta-analysis. The in-text citations to studies selected for meta-analysis are not followed by asterisks.

Anderman, E. M., & Johnston, J. (1998). Television news in the classroom what are adolescents learning? *Journal of Adolescent Research, 13*(1), 73–100.

Anderman, L. H., & Anderman, E. M. (1999). Social predictors of changes in students' achievement goal orientations. *Contemporary Educational Psychology, 24*(1), 21–37. doi:10.1006/ceps.1998.0978*

Arenas, A., Tabernero, C., & Briones, E. (2006). Effects of goal orientation, error orientation and self-efficacy on performance in an uncertain situation. *Social Behavior and Personality: An İnternational Journal*, *34*(5), 569–586. *

Bayless, G. E. (2009). *High school students' personal epistemologies, goal orientation, and academic performance* (Order No. 3385754, University of California).*

Bell, B. S., & Kozlowski, W. J. (2002). Goal orientation and ability: interactive effects on self-efficacy, performance, and knowledge. *Journal of Applied Psychology, 87*(3), 497–505.*

Bell, P. D. (2006). *Can factors related to self-regulated learning and epistemological beliefs predict learning achievement in undergraduate asynchronous web-based courses?* (Order No. 3233020, North Carolina State University).*

Bipp, T., Steinmayr, R., & Spinath, B. (2012). A functional look at goal orientations: Their role for self-estimates of intelligence and performance. *Learning and Individual Differences, 22*(3), 280–289.*

Bjornebekk, G., Gjesme, T., & Ulriksen, R. (2011). Achievement motives and emotional processes in children during problem-solving: Two experimental studies of their relation to performance in different achievement goal conditions. *Motivation and Emotion, 35,* 351–367.*

Borenstein, M., Hedges, L. V., Higgins, J. P. T., & Rothstein, H. R. (2009). *Introduction to meta-analysis*. Chichester: John Wiley & Sons.

Brandt, T. L. S. (1997). *Goal orientation and achievement behavior: An analysis of goal configurations* (Order No. 1386195, San Jose State University).*

Brett, J. F., & VandeWalle, D. (1999). Goal orientation and goal content as predictors of performance in a training program. *Journal of Applied Psychology, 84*(6), 863–873.*

Brophy, J. (2005). Goal theorists should move on from performance goals. *Educational Psychologist, 40*(3), 167–176.

Button, S., Mathieu, J., & Zajac, D. (1996). Goal orientation in organizational behavior research: A conceptual and empirical foundation. *Organizational Behavior and Human Decision Processes, 67,* 26–48.

Carpenter, S. L. (2007). *A comparison of the relationships of students' self-efficacy, goal orientation, and achievements across grade levels: A meta-analysis* (Order No. MR38322, Simon Fraser University).

Cellar, D. F., Stuhlmacher, A. F., Young, S. K., Fisher, D. M., Adair, C. K., Haynes, S., … & Riester, D. (2011). Trait goal orientation, self-regulation, and performance: A meta-analysis. *Journal of Business and Psychology, 26*(4), 467–483.

Cerasoli, C. P., & Ford, M. T. (2014). Intrinsic motivation, performance, and the mediating role of mastery goal orientation: a test of self-determination theory. *The Journal of Psychology, 148*(3), 267–286.*

Chea, S. (2012). *The relationships among writing self-efficacy, writing goal orientation, learning strategies, and writing achievement* (Order No. 1513414, Northern Illinois University).*

Chen, G., & Mathieu, J. E. (2008). Goal orientation dispositions and performance trajectories: The roles of supplementary and complementary situational inducements. *Organizational Behavior and Human Decision Processes, 106,* 21–38.*

Chen, W. W. (2015). The relations between perceived parenting styles and academic achievement in Hong Kong: The mediating role of students' goal orientations. *Learning and Individual Differences*, *37*, 48–54.*

Chen, W. W., & Wong, Y. L. (2015a). Chinese mindset: Theories of intelligence, goal orientation and academic achievement in Hong Kong students. *Educational Psychology, 35*(6), 714–725. doi:10.1080/01443410.2014.893559*

Chen, W. W., & Wong, Y. L. (2015b). The relationship between goal orientation and academic achievement in Hong Kong: The role of context. *The Asia-Pacific Education Researcher, 24*(1), 169–176.*

Cho, H. (2011). *The relationship of model minority stereotype, Asian cultural values, and acculturation to goal orientation, academic self-efficacy, and academic achievement in Asian American college students* (Order No. 3465964, University of Southern California).*

Cohen J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum.

Coutinho, S. A. (2006). A model of metacognition, achievement goal orientation, learning style, and self-efficacy (Order No. 3227643, Northern Illinois University).*

Damian, L. E., Stoeber, J., Negru, O., & Băban, A. (2014). Perfectionism and achievement goal orientations in adolescent school students. *Psychology in the Schools, 51*(9), 960–971.*

D'Anjou, T. A. (2008). *Validation of the essay coding system for performance goals and learning goals: Associations with goal orientation inventory, coping, mood, and school performance* (Order No. 3341037, University of Miami).*

Davis, W. D., Carson, C. M., Ammeter, A. P., & Treadway, D. C. (2005). The interactive effects of goal orientation and feedback specificity on task performance. *Human Performance, 18*(4), 409–426. doi:10.1207/s15327043hup1804_7*

Davis, W. D., Mero, N., & Goodman, J. M. (2007). The interactive effects of goal orientation and accountability on task performance. *Human Performance, 20*(1), 1–21. doi:10.1207/s15327043hup2001_1*

Day, E. A., Radosevich, D. J., & Chasteen, C. S. (2003). Construct- and criterion-related validity of four commonly used goal orientation instruments. *Contemporary Educational Psychology, 28*(4), 434–464. doi:10.1016/S0361-476X(02)00043-7*

de Bruyn, E. H., Deković, M., & Meijnen, G. W. (2003). Parenting, goal orientations, classroom behavior, and school success in early adolescence. *Journal of Applied Developmental Psychology, 24*(4), 393–412.*

Dickenson, P. A. (2009). *Goal orientation of Latino English language: The relationship between students' engagement, achievement and teachers' instructional practices in mathematics* (Order No. 3368513, University of Southern California).*

Diefendorff, J. M. (2004). Examination of the roles of action-state orientation and goal orientation in the goal-setting and performance process. *Human Performance*, *17*(4), 375–395.*

Diseth, Å. (2011). Self-efficacy, goal orientations and learning strategies as mediators between preceding and subsequent academic achievement. *Learning and Individual Differences, 21*(2), 191–195. doi:10.1016/j.lindif.2011.01.003*

Duchesne, S., Ratelle, C. F., & Feng, B. (2014). Developmental trajectories of achievement goal orientations during the middle school transition the contribution of emotional and behavioral dispositions. *The Journal of Early Adolescence*, *34*(4), 486–517.*

Duke, B. L. (2003). *The influence of using cognitive strategy instruction through writing rubrics on high school students' writing self-efficacy, achievement goal orientation, perceptions of classroom goal structures, self-regulation, and writing achievement* (Order No. 3109071, The University of Oklahoma).*

Dupeyrat, C., & Mariné, C. (2005). Implicit theories of intelligence, goal orientation, cognitive engagement, and achievement: A test of Dweck's model with returning to school adults. *Contemporary Educational Psychology*, *30*(1), 43–59.*

Dweck, C. S. (1986). Motivational processes affecting learning. *American Psychologist, 41,* 1040–1048.

Elliot, A. J. (1999). Approach and avoidance motivation and achievement goals. *Educational psychologist, 34*(3), 169–189.

Elliot, A. J., & McGregor, H. A. (2001). A 2 × 2 achievement goal framework. *Journal of Personality and Social Psychology, 80*(3), 501–519.

Ernest, P. (1989). The knowledge, beliefs and attitudes of the mathematics teacher: A model. *Journal of Education for Teaching, 15*(1), 13–33.

Eum, K., & Rice, K. G. (2011). Test anxiety, perfectionism, goal orientation, and academic performance. *Anxiety, Stress & Coping, 24*(2), 167–178. doi:10.1080/10615806.2010.488723*

Gibson, D. (2006). *The association of students' academic efficacy, achievement goal orientation, and teacher rapport with disruptive behavior in the classroom* (Order No. 3229029, St. John's University, New York).*

Godshalk, V. M. & Sosik, J. J (2003). Aiming for career success: The role of learning goal orientation in mentoring relationships. *Journal of Vocational Behavior, 63*(3) 417–437.*

Goldsworthy, S. J., Goodman, B., & Muirhead, B. (2005). Goal orientation and its relationship to academic success in a laptop-based BScN program. *International Journal of Nursing Education Scholarship, 2*(1), 1–16.*

Goraya, F., & Hasan, S. S. (2012). Achievement goal orientation and academic performance in undergraduate students. *Pakistan Journal of Social and Clinical Psychology, 9*(3), 27–31.*

Gutman, L. M. (2006). How student and parent goal orientations and classroom goal structures influence the math achievement of African Americans during the high school transition. *Contemporary Educational Psychology, 31*(1), 44–63. doi:10.1016/j.cedpsych.2005.01.004*

Haeggberg, D. (2000). *The influence of goal orientation on individuals' cognitive, affective, and behavioral reactions to different types of performance feedback* (Order No. 9975063, Ohio University).*

Hagan, W. J. (2003). The influence of African self-consciousness, purpose, and achievement goal orientation on the academic achievement of African-American students at a predominantly white university (Order No. 3092442, The University of Memphis).*

Harbaugh, A. G. (2009). *Epistemic belief and achievement goal orientation profiles of students in junior college mathematics courses* (Order No. 3377244, University of Washington).*

Hedges, L. V., & Olkin, I. (1985). *Statistical method for meta-analysis*. United Kingdom: Academic.

Higgins, S., Hall, E., Wall, K., Woolner, P., & McCaughey, C. (2005). *The impact of school environments: A literature review*. London: Design Council.

Hinton, I. D. (1994). *The influence of culture, family, peers and achievement goal tendency on African-American academic outcome* (Order No. 9506959, University of Virginia).*

Horn, C. A. (1993). *An exploration of the effects of general ability, mastery goal orientation, self-efficacy, and elaborative strategy use on student achievement and construction of domain knowledge in introductory biology* (Order No. 9333967, The University of Nebraska—Lincoln).*

Howell, A. J., & Watson, D. C. (2007). Procrastination: Associations with achievement goal orientation and learning strategies. *Personality & Individual Differences, 43*(1), 167–178. doi:10.1016/j.paid.2006.11.017*

Johnson, K. R. (2012). *The effects of goal orientation and feedback on the notetaking habits and performance of college students* (Order No. 3507530, Columbia University).*

Johnson, P. D., Shull, A., & Wallace, J. C. (2011). Regulatory focus as a mediator in goal orientation and performance relationships. *Journal of Organizational Behavior, 32*(5), 751–766. doi:10.1002/job.701*

Kaplan, A., & Maehr, M. L. (2007). The contributions and prospects of goal orientation theory. *Educational Psychology Review, 19*(2), 141–184.

Keys, T. D., Conley, A. M., Duncan, G. J., & Domina, T. (2012). The role of goal orientations for adolescent mathematics achievement. *Contemporary Educational Psychology, 37*(1), 47–54. doi:10.1016/j.cedpsych.2011.09.002*

King, L. A., & Williams, T. A. (1997). Goal orientation and performance in martial arts. *Journal of Sport Behavior, 20*(4), 397–411.*

Kitsantas, A., Steen, S., & Huie, F. (2009). The role of self-regulated strategies and goal orientation in predicting achievement of elementary school children. *International Electronic Journal of Elementary Education, 2*(1), 65–81.*

Kozlowski, S. W., Gully, S. M., Brown, K. G., Salas, E., Smith, E. M., & Nason, E. R. (2001). Effects of training goals and goal orientation traits on multidimensional training outcomes and performance adaptability. *Organizational Behavior and Human Decision Processes*, *85*(1), 1–31.*

Kulinskaya, E., Morgenthaler, S., & Staudte, R. G. (2008). *Meta analysis: A guide to calibrating and combining statistical evidence*. London: Wiley.

Lee, K., Ning, F., & Goh, H. C. (2014). Interaction between cognitive and non-cognitive factors: The influences of academic goal orientation and working memory on mathematical performance. *Educational Psychology, 34*(1), 73–91. doi:10.1080/01443410.2013.836158*

Lee, L. H. (1997). *Goal orientation, goal setting, and academic performance in college students: An integrated model of achievement motivation in school settings* (Order No. 9835095, University of Southern California).*

Lehmann, R. L. (2001). *Enhancing the valuing of and commitment to effortful achievement: An achievement goal approach* (Order No. 9999973, University of Minnesota).*

Leung, K., Chen, T., & Chen, G. (2014). Learning goal orientation and creative performance: The differential mediating roles of challenge and enjoyment intrinsic motivations. *Asia Pacific Journal of Management, 31*(3), 811–834. doi:10.1007/s10490-013-9367-3*

Lindsay, P. C. (2010). *Assessing the relationships among achievement goal orientation, test anxiety, self-efficacy, metacognition, and academic performance* (Order No. 1480722, Northern Illinois University).*

Lu, L., Lin, X., & Leung, K. (2012). Goal orientation and innovative performance: the mediating roles of knowledge sharing and perceived autonomy. *Journal of Applied Social Psychology, 42*, 180–197. doi:10.1111/j.1559-1816.2012.01018.x*

Mägi, K., Lerkkanen, M. K., Poikkeus, A. M., Rasku-Puttonen, H., & Kikas, E. (2010). Relations between achievement goal orientations and math achievement in primary grades: A follow-up study. *Scandinavian Journal of Educational Research, 54*(3), 295–312.*

Ma, X. (1997). Reciprocal relationships between attitude toward mathematics and achievement in mathematics. *The Journal of Educational Research, 90*(4), 221–229.

Maehr, M. L., & Meyer, H. A. (1997). Understanding motivation and schooling: Where we've been, where we are, and where we need to go. *Educational Psychology Review, 9*(4), 371–409.

Magno, C. (2012). Implicit theories of intelligence, achievement goal orientation, and academic achievement of engineering students. *International Journal of Research & Review, 9*(1), 32–43.*

Malmberg, L. E. (2006). Goal-orientation and teacher motivation among teacher applicants and student teachers. *Teaching and Teacher Education*, *22*(1), 58–76.*

Malpass, J. R. (1994). *A structural model of self-efficacy, goal orientation, worry, self-regulated learning, and high-stakes mathematics achievement* (Order No. 9601023, University of Southern California).*

Mangos, P. M., & Steele-Johnson, D. (2001). The role of subjective task complexity in goal orientation, self-efficacy, and performance relations. *Human Performance, 14*(2), 169–185.*

Meece, J. L., Herman, P., & McCombs, B. L. (2003). Relations of learner-centered teaching practices to adolescents' achievement goals. *International Journal of Educational Research*, *39* (4), 457–475.*

Meissel, K., & Rubie-Davies, C. M. (2016). Cultural invariance of goal orientation and self-efficacy in New Zealand: Relations with achievement. *British Journal of Educational Psychology, 86*(1), 92–111. doi:10.1111/bjep.12103*

Merriman, K. K., Clariana, R. B., & Bernardi, R. J. (2012). Goal orientation and feedback congruence: effects on discretionary effort and achievement. *Journal of Applied Social Psychology, 42*(11), 2776–2796. doi:10.1111/j.1559-1816.2012.00961.x*

Merritte, K. K. (1999). *A domain-specific investigation of goal orientation, related cognitive and behavioral variables, and prediction model for academic achievement* (Order No. 9948230, Tulane University).*

Meuschke, D. M. (2005). *The relationship between goal-orientation, help-seeking, math self-efficacy, and mathematics achievement in a community college* (Order No. 3220135, University of Southern California).*

Midgley, C., Kaplan, A., Middleton, M., Maehr, M. L., Urdan, T., Anderman, L. H., et al. (1998). The development and validation of scales assessing students' achievement goal orientations. *Contemporary Educational Psychology, 23*(2), 113–131.

Midgley, C. & Urdan, T. (2001). Academic self-handicapping and achievement goals: a further examination. *Contemporary Educational Psychology 26*(1), 61–75.*

Mihalecz, M. C. (2011). *Stability and change in goal orientation and their relationship with performance: Testing density distributions using latent trait-state models* (Order No. 3515431, Old Dominion University).*

Muis, K. R., & Franco, G. M. (2009). Epistemic beliefs: Setting the standards for self-regulated learning. *Contemporary Educational Psychology*, *34*(4), 306–318.*

Niepel, C., Brunner, M., & Preckel, F. (2014). Achievement goals, academic self-concept, and school grades in mathematics: Longitudinal reciprocal relations in above average ability secondary school students. *Contemporary Educational Psychology, 39*, 301–313.*

Owens, K. (2005). *Cyberspace versus face-to-face: The influence of learning strategies, self-regulation, and achievement goal orientation* (Order No. 3195649, James Madison University).*

Oyer, M. H. (2014). *Investigating gender differences in achievement goal orientation in example-based algebra learning* (Order No. 3637469, Temple University).*

Pajares, F., Britner, S. L., & Valiante, G. (2000). Relation between achievement goals and self-beliefs of middle school students in writing and science. *Contemporary Educational Psychology*, *25*(4), 406–422.*

Park, Y., Kim, T. S., & Park, S. W. (2016). Change in goal orientation of Korean high school athletes: A cross-temporal meta-analysis, 1999–2014. *Personality and Individual Differences, 94,* 342–347.

Pastor, D. A., Barron, K. E., & Miller, B. J. (2007). A latent profile analysis of college students' achievement goal orientation. *Contemporary Educational Psychology, 32*(1), 8–47. doi:10.1016/j.cedpsych.2006.10.003*

Patrick, H., Ryan, A. M., & Pintrich, P. R. (1999). The differential impact of extrinsic and mastery goal orientations on males' and females' self-regulated learning. *Learning and Individual Differences, 11*(2), 153–171. doi:10.1016/S1041-6080(00)80003-5*

Paulick, I., Watermann, R., & Nückles, M. (2013). Achievement goals and school achievement: The transition to different school tracks in secondary school. *Contemporary Educational Psychology*, *38*(1), 75–86.*

Pekrun, R., Elliot, A., & Maier, M. (2006). Achievement goals and discrete achievement emotions: A theoretical model and prospective test. *Journal of Educational Psychology, 98*, 583–597.

Peng, P. (2007). *Investigating achievement goal orientation in arts and general academic classrooms: A cross-domain study* (Order No. 3321428, University of South Carolina).*

Phillips, J. M., & Gully, S. M. (1997). Role of goal orientation, ability, need for achievement, and locus of control in the self-efficacy and goal-setting process. *Journal of Applied Psychology, 82*(5), 792–802.*

Pieterse, A. N., Van Knippenberg, D., & van Ginkel, W. P. (2011). Diversity in goal orientation, team reflexivity, and team performance. *Organizational Behavior and Human Decision Processes, 114*(2), 153–164.*

Pieterse, A. N., Van Knippenberg, D., & Van Dierendonck, D. (2013). Cultural diversity and team performance: The role of team member goal orientation. *Academy of Management Journal*, *56*(3), 782–804.*

Pintrich, P. R. (2000). Multiple goals, multiple pathways: The role of goal orientation in learning and achievement. *Journal of Educational Psychology, 92*(3), 544–555.

Plante, I., O'Keefe, P. A., & Théorêt, M. (2013). The relation between achievement goal and expectancy-value theories in predicting achievement-related outcomes: A test of four theoretical conceptions. *Motivation and Emotion*, *37*(1), 65–78.*

Porter, C. O. (2005). Goal orientation: effects on backing up behavior, performance, efficacy, and commitment in teams. *Journal of Applied Psychology*, *90*(4), 811–818.*

Porter, C. O., Franklin, D. A., Swider, B. W., & Yu, R. C. F. (2016). An exploration of the interactive effects of leader trait goal orientation and goal content in teams. *The Leadership Quarterly*, *27*(1), 34–50.*

Prenger, M. A. (1999). *The effects of ethnicity, gender, years in school, being on scholarship, and sport type and the mediating effects of personality and goal orientation on athletic and academic performance in university athletes* (Order No. 9987633, University of Southern California).*

Pulkka, A.-T. & Niemivirta, M. (2013). In the eye of the beholder: Do adult students' achievement goal orientation profiles predict their perceptions of instruction and studying? *Studies in Educational Evaluation, 39*(3), 133–143. doi:10.1016/j.stueduc.2013.06.002*

Putwain, D. W., & Daniels, R. A. (2010). Is the relationship between competence beliefs and test anxiety influenced by goal orientation? *Learning and Individual Differences, 20*(1), 8–13. doi:10.1016/j.lindif.2009.10.006*

Radosevich, D. J., Vaidyanathan, V. T., Yeo, S. Y., & Radosevich, D. M. (2004). Relating goal orientation to self-regulatory processes: A longitudinal field test. *Contemporary Educational Psychology, 29*(3), 207–229. doi:10.1016/S0361-476X(03)00032-8*

Rivers, J., Jr. (2008). *The relationship between parenting style and academic achievement and the mediating influences of motivation, goal-orientation and academic self-efficacy* (Order No. 3340755, The Florida State University).*

Russell, A. M. (2002). *The relation between high school students*' *goal-setting and their self-efficacy, goal-orientation, and achievement* (Order No. 1409799, University of Houston).*

Sánchez Rosas, J. (2015). Validation of the achievement goal questionnaire-revised in argentinean university students (A-AGQ-R). *International Journal of Psychological Research, 8*(1), 10–23.*

Seaton, M., Parker, P., Marsh, H. W., Craven, R. G., & Yeung, A. S. (2014). The reciprocal relations between self-concept, motivation and achievement: juxtaposing academic self-concept and achievement goal orientations for mathematics success. *Educational psychology*, *34*(1), 49–72.*

Simons, J., Dewitte, S., & Lens, W. (2004). The role of different types of instrumentality in motivation, study strategies, and performance: Know why you learn, so you'll know what you learn! *British Journal of Educational Psychology 74*(3), 343–360.*

Sins, P. H., van Joolingen, W. R., Savelsbergh, E. R., & van Hout-Wolters, B. (2008). Motivation and performance within a collaborative computer-based modeling task: Relations between students' achievement goal orientation, self-efficacy, cognitive processing, and achievement. *Contemporary Educational Psychology*, *33*(1), 58–77.*

Spray, C. M., John Wang, C. K., Biddle, S. J., & Chatzisarantis, N. L. (2006). Understanding motivation in sport: An experimental test of achievement goal and self determination theories. *European Journal of Sport Science*, *6*(1), 43–51.*

Stansbury, S. L. (1997). *The effect of parental education, prior achievement, self-efficacy, goal orientation, and effort on undergraduate science performance of Latinos and Caucasians* (Order No. 9835180, University of Southern California).*

Steinmayr, R., Bipp, T., & Spinath, B. (2011). Goal orientations predict academic performance beyond intelligence and personality. *Learning and Individual Differences, 21*(2), 196–200. doi:10.1016/j.lindif.2010.11.026*

Travers, L. V., Bohnert, A. M., & Randall, E. T. (2013). Brief report: Adolescent adjustment in affluent communities: The role of motivational climate and goal orientation. *Journal of Adolescence, 36*(2), 423–428. doi:10.1016/j.adolescence.2012.11.009*

Tuominen-Soini, H., Salmela-Aro, K., & Niemivirta, M. (2011). Stability and change in achievement goal orientations: A person-centered approach. *Contemporary Educational Psychology, 36*(2), 82–100. doi:10.1016/j.cedpsych.2010.08.002*

van Dierendonck, D., & van der Gaast, E. (2013). Goal orientation, academic competences and early career success. *Career Development International*, *18*(7), 694–711.*

VandeWalle, D. (1997). Development and validation of a work domain goal orientation instrument. *Educational and Psychological Measurement, 57*, 995–1015.

VandeWalle, D. (2001). Goal orientation: Why wanting to look successful doesn't always lead to success. *Organizational Dynamics, 30*(2), 162–171. doi:10.1016/S0090-2616(01)00050-X*

Verner-Filion, J., & Gaudreau, P. (2010). From perfectionism to academic adjustment: The mediating role of achievement goals. *Personality and Individual Differences*, *49*(3), 181–186.*

Vygotsky, L. S. (1980). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.

Wahlstrom, D. A. (2001). *Technology-mediated assessment in a secondary manufacturing technology program: A study of the relationship between participants' goal-orientation and the calibration of performance expectations to performance feedback* (Order No. 3016778, University of Michigan).*

Weidinger, A. F., Spinath, B., & Steinmayr, R. (2016). Why does intrinsic motivation decline following negative feedback? The mediating role of ability self-concept and its moderation by goal orientations. *Learning and Individual Differences, 47,* 117–128. doi:10.1016/j.lindif.2016.01.003*

Wolters, C. A., Yu, S. L., & Pintrich, P. R. (1996). The relation between goal orientation and students' motivational beliefs and self-regulated learning. *Learning and Individual Differences, 8*(3), 211–238. doi:10.1016/S1041-6080(96)90015-1*

Wu, P. (2006). *The effects of goal orientation, self-efficacy, and cognitive/metacognitive self-regulatory strategy use on EFL college students' course achievement* (Order No. 3238324, University of Southern California).*

Xiang, P., Bruene, A., & McBride, R. E. (2004). Using achievement goal theory to assess an elementary physical education running program. *The Journal of School Health*, *74*(6), 220–225.*

Yeo, G. B., & Neal, A. (2004). A multilevel analysis of effort, practice, and performance: effects; of ability, conscientiousness, and goal orientation. *The Journal of Applied Psychology, 89*(2), 231–247.*

Yeo, G. B., Sorbello, T., Koy, A., & Smillie, L. D. (2008). Goal orientation profiles and task performance growth trajectories. *Motivation & Emotion, 32*(4), 296–309. doi:10.1007/s11031-008-9099-8*

Zubkovic, B. R., & Kolic-Vehovec, S. (2014). Perceptions of contextual achievement goals: contribution to high-school students' achievement goal orientation, strategy use and academic achievement. *Studia Psychologica, 56*(2), 137–153.*

Chapter 19
The Effect of Learning Types/Styles on Student Achievement

Yusuf Ay

19.1 Introduction

An individual difference among students is one of the situations that teachers encounter in the educational environment. This is one of the many variables that influence the academic achievement of students. It should be recognized and taken into account that individual differences will emerge as a natural result of the presence of many different people in the educational environments. The fact that each student has a unique learning style is widely accepted today.

The concept of “learning style” was firstly proposed by Rita Dunn in 1960. It has been worked on continuously over the years and various studies have been conducted. The purpose of these studies was to demonstrate that people get, process, store, restore and learn the knowledge differently from each other, putting the concept of style in the center. This topic entered into schools and has found an application area much later than the 1960s (Boydak 2001). Although different authors propose different definitions based on different conceptualizations, learning style is usually defined as “characteristic strengths and preferences that individuals have in the process of receiving, holding and processing the information” (Felder and Silverman 1988). Loo (2002) has described learning style as the way people respond to or interact with the stimuli they receive from the environment while learning a new subject; whereas Shaughnessy (1998) has defined it as the concentration, the process and the internalization of the knowledge and the ways/processes of recalling new and difficult information. Keefe (1979) explained learning style noting that it is the source of relatively stable cognitive, affective and psychological behaviors about how people respond to their learning environment as well as about how they interact with their learning environment and perceive it; whereas Curry (2000) has defined it as the individual differences in perception,

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memory, thinking and judging in case of a stimulus. Finally, according to Kolb (1981), learning style is the personally preferred way/method for grasping and processing information.

Individuals, who are different from each other in many ways, such as in their cognitive, affective, social and psychomotor characteristics, have different ways of learning. Instead of treating the different individuals as a homogenous group and teaching them all through the same learning methods, educators should identify individuals' learning styles and take these different styles into account in the regulation of education environments. In this way the learning process and the cognitive and emotional development of students will be enriched (Sapancı 2014).

Various learning style models are presented in the literature. The theories of personality, the results of the studies which examined individual abilities and various evaluations of educational institutions were all used in the formation of these models (Keefe and Ferrell 1990).

The most famous models regarding the identification of learning styles are the following: Myers–Briggs Type Indicator, Kolb's Experiential Learning Style Model, Felder-Silverman Learning Style Model, Hermann Brain Dominance Model, Gregory's Learning Style Model, McCarthy's Learning Style Model, Dunn-Dunn Learning Style Model and Grasha Learning Style Model (Bilgin and Bahar 2008).

Recently, the focus of the literature is on the relationship between learning styles and academic achievement in different disciplines and subjects: biology (Fan et al. 2015), economics (Terregrossa et al. 2012; Englander et al. 2011), English (Elliot 2006), foreign language (Bailey et al. 2000; Cesur and Fer 2011), history (Bozkurt 2013), humanities (Rezaeinejad et al. 2015), language (Shay 1994; Williams 2008; Chen et al. 2010; Ahmad et al. 2011), mathematics (Shay 1994; Treacy 1996; Bilgin and Durmuş 2003; Husch 2001; Davis 2007; Williams 2008; Chen et al. 2010; Sriphai et al. 2011; Jahanbakhsh 2012; Rezaeinejad et al. 2015), microeconomics (Terregrossa et al. 2009), non-technical subject (Omar et al. 2015), psychology (Busato et al. 2000), reading (Snyder 1999; Littin 2001), science (Bilgin and Durmuş 2003; Williams 2008; Chen et al. 2010; Jahanbakhsh 2012; Rezaeinejad et al. 2015), social science (Bilgin and Durmuş 2003; Williams 2008), technical writing (Roberts 1999), Turkish (Bilgin and Durmuş 2003), vocabulary (Leone 2008), accounting (Terregrossa et al. 2012), agriculture (Dyer 1995).

A number of different variables, along with the results of previous research studies, were used to test the following hypotheses of this research:

H_1 Learning types/styles have a positive effect on student achievement.
H_2 Publication type is a moderator for the positive effect of learning types/styles on student achievement.
H_3 Sample group is a moderator for the positive effect of learning types/styles on student achievement.
H_4 School subject is a moderator for the positive effect of learning types/styles on student achievement.

H_5 Tool of data collection is a moderator for the positive effect of learning types/styles on student achievement.

H_6 The year of the studies is a moderator for the positive effect of learning types/styles on student achievement.

H_7 Culture is a moderator for the positive effect of learning types/styles on student achievement.

19.2 Method

19.2.1 Study Design

In this study, the effect of learning types/styles on student achievement was tested with a meta-analysis design.

19.2.2 Review Strategy and Criteria for Inclusion/Exclusion

To determine the research studies to include in the meta-analysis, the Science-Direct, ProQuest and Ebsco academic databases were used to conduct a literature review. For this process, the terms *learning types/styles* and *student achievement/student success* included in the titles of the studies were used to screen the research studies. The end date for the research studies included in the research was identified as January 2016. Doctoral dissertations and peer-reviewed journals were included in the study.

Many strategies were used to identify the research studies that were appropriate for the meta-analysis of the study. First, a research study pool (443 research studies) was established; it included all studies with learning types/styles and student achievement/success in their titles. The abstracts of these studies were reviewed, and all were found to be appropriate to include in the study. In the second stage, all research studies in the pool were examined in detail. The results of the examination found that 60 of the research studies in the pool were appropriate, and 383 were not found to be suitable. The descriptive statistics of the 60 research studies included in the analysis are presented in Table 19.1.

The criteria for inclusion of the research studies in the analysis study were identified as follows:

- To have the statistical information necessary for correlational meta-analysis (n and r, or R^2 values)
- To be a study measuring the correlation learning types/styles and student achievement/success

Table 19.1 Characteristics of the studies included in the meta-analysis

Variables		1	2	3	4	5	Total
Type of publication		Thesis	Article				–
	n	25	35				60
	%	41.6	58.4				100
Sample group/unit		University	Collage	Elementary school	High school	Middle school	–
	n	22	4	5	17	12	60
	%	36.7	6.6	8.3	28.4	20.0	100

Reasons for not including a research study in the meta-analysis:

- Having no quantitative data (qualitative research)
- Not having a correlation coefficient
- Not focusing on student achievement
- Not focusing on learning types/styles.

19.2.3 Coding Process

The coding process was essentially a data sorting process used to ascertain which data were clear and suitable for the study. In this scope, a coding form was developed before the statistical analysis was conducted, and the coding was conducted according to the form. The main aim was to develop a specific coding system that allowed the study to see the entirety of the research studies in general and that would not miss any characteristics of each individual research study. The coding form developed in the study was comprised of:

- References for the research
- Sample information
- Sample group
- Type of publication,
- School subject
- Data collection tool(s)
- The years of the studies
- Culture.

19.2.4 Statistical Processes

The effect size acquired in meta-analysis is a standard measure value used in the determination of the strength and direction of the relationship in the study

(Borenstein et al. 2009). Pearson's correlation coefficient (*r*) was determined to be the effect size in this study. Because the correlation coefficient has a value between *+1* and *−1,* the *r* value calculated was evaluated by converting this value into the value as it appears in the *z* table (Hedges and Olkin 1985). Provided that more than one correlation value is given between the same structure categories in correlational meta-analysis studies, two different approaches are used in the determination of the one to be used in the meta-analysis (Borenstein et al. 2009; Kulinskaya et al. 2008). For this study, (*i*) first, if the correlations were independent, all the related correlations were included in the analysis and were considered to be independent studies, and (*ii*) if there were dependent correlations, then the *highest correlation value* were accepted. A *random effect model* was used for the meta-analysis processes in this study. The *Comprehensive Meta-Analysis* program was used in the meta-analysis process.

19.2.5 Moderator Variables

To determine the statistical significance of the differences between the moderators of the study, only the Q_b values were used. Six moderator variables that were expected to have a role in the average effect size were identified in the study. The first of these considered is the *sample group* as a moderator in regards to the relationship between learning types/styles and student achievement. The second is the *school subject* which was thought to have a role on the average impact of learning types/styles on student achievement. The rest are the *type of publication, the year of the studies, data collection tools* and *culture.*

19.2.6 Publication Bias

A funnel plot for the research studies included in the meta-analysis of can be seen in Fig. 19.1. Evidence that publication bias affected the research studies included in the meta-analysis can be seen in Fig. 19.1. A serious asymmetry would be expected in the funnel plot if there were a publication bias. The concentration of plots on one side under the line of average effect size, particularly in the bottom section of the funnel, suggests the probability of a publication bias in the research studies. Evidence for publication bias was observed for the 9 research studies included in the meta-analysis study.

A publication bias was observed in the funnel plot, and the results of Duval and Tweedie's trim and fill test, which was applied to determine the effect size related to partiality in the publications that was acquired with the meta-analysis using the random effect model, are shown in. As seen in Table 19.2, there is a difference between the observed effect size and the virtual effect size established to correct the effect of the publication bias. The reason for the difference is the asymmetry of the

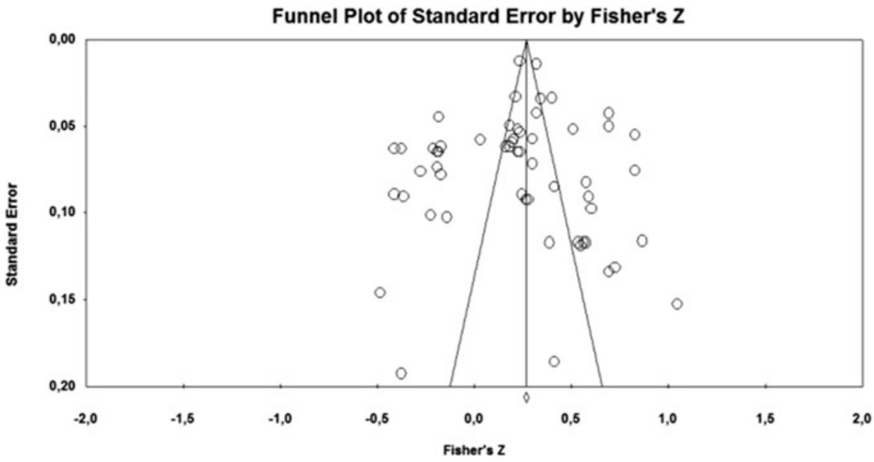

Fig. 19.1 Effect size funnel for publication bias

Table 19.2 Duval and Tweedie's trim and fill test results

	Excluded studies	Point estimate	CI (confidence interval)		*Q*
			Lower limit	Upper limit	
Observed values		0.23	0.17	0.30	1603.35542
Corrected values	9	0.14	0.07	0.22	2633.75865

concentration on both sides of the center line and the studies plotted to the left of and above the center line, skewing the symmetry.

19.3 Findings

Table 19.3 displays the results of the meta-analysis examining the relationship between learning types/styles and student achievement. The findings supported hypothesis H_1 which formulated that there is a positive relationship between learning types/styles and student achievement. The effect size of learning style on student achievement was calculated as 0.23, which shows that learning style has a medium effect (*see* Cohen 1988) on students' academic achievement.

The results of the moderator analysis did not support hypothesis H_2 which formulated that the publication type plays a moderator role in academic achievement. Although the moderator analysis showed that the difference between the effect sizes of the publication types was not statistically significant ($Qb = 3.52$,

Table 19.3 Findings of the correlations between learning types/styles and academic achievement: results of meta-analysis

Variable	k	N	*r*	CI (confidence interval)		*Q*	Q_b
				Lower limit	Upper limit		
Learning types/styles	60	26391	0.23*	0.17	0.30	1603.35*	
Moderator [school subject]							**85.11***
Accounting	1	61	0.62*	0.23	0.83		
Agriculture	1	120	0.27	−0.17	0.62		
Biology	1	46	0.79*	0.49	0.91		
Economics	3	259	0.56*	0.38	0.73		
English	1	125	0.35	0.67	0.08		
Foreign lang.	6	1770	0.38*	0.22	0.52		
GPA	17	16324	0.17*	0.07	0.27		
History	1	175	−0.27	−0.61	0.16		
Humanities	1	50	−0.45	−0.75	0.01		
Mathematics	11	2784	0.41*	0.29	0.51		
Non-technical	1	288	0.19	−0.23	0.55		
Psychology	1	409	0.18	−0.23	0.54		
Reading	5	1133	−0.22*	−0.40	−0.04		
Science	5	1405	0.29*	0.10	0.46		
Social science	2	316	0.15	−0.15	0.44		
Technical	1	32	0.39	−0.13	0.74		
Turkish	1	240	−0.18	−0.56	0.24		
Vocabulary	1	854	0.33	−0.07	0.64		
Moderator [publication type]							**3.52**
Article	35	9800	0.28*	0.20	0.36		
Thesis	25	16591	0.16*	0.05	0.26		

(continued)

Table 19.3 (continued)

Variable	k	N	r	CI (confidence interval)		Q	Q_b
				Lower limit	Upper limit		
Moderator [sample group]							**8.82***
Collage	4	575	−0.09	−0.37	0.20		
Elementary school	5	1796	0.03	−0.21	0.27		
High school	17	4401	0.28*	0.15	0.40		
Middle school	12	8581	0.30*	0.14	0.44		
University	22	11038	0.26*	0.14	0.37		
Moderator [data collection tool]							**14.27***
BE (Rundle, & Dunn)	1	503	−0.18*	−0.26	−0.09		
FLSI	7	1489	0.19	0.14	0.24		
NEO-FFI	1	308	0.29*	0.18	0.38		
GEFT	3	416	0.22*	0.12	0.31		
GSD	1	562	0.10*	0.01	0.18		
HAQLS	1	300	0.03	−0.08	0.14		
ILP	1	308	0.20*	0.09	0.30		
ILS (Felder and Solomon)	1	877	0.15*	0.08	0.21		
ILS (Vermunt)	2	1323	0.20*	0.14	0.25		
LSA	1	400	0.47*	0.39	0.54		
LSI (Burke & Dunn)	1	854	0.33*	0.26	0.38		
LSI (Dunn and Dunn)	5	420	0.18	0.09	0.28		
LSI (Dunn)	5	559	0.17	0.09	0.25		
LSI (Dunn, Dunn and Price)	1	377	0.22*	0.12	0.31		
LSI (Grasha and Riechmann)	7	1643	0.13	0.09	0.18		
LSI (Kolb)	13	7973	0.33*	0.31	0.35		
LSI (Renzulli and Smith)	2	6743	0.20	0.18	0.23		

(continued)

Table 19.3 (continued)

Variable	k	N	r	CI (confidence interval)		Q	Q_b
				Lower limit	Upper limit		
LSI (Nigro)	1	59	0.60*	0.40	0.74		
LSP (Keefe)	2	256	−0.08	−0.20	0.04		
LSS	1	376	0.23*	0.13	0.32		
OWLS	1	255	−0.36*	−0.46	−0.24		
SSQ	1	150	0.28*	0.12	0.42		
TVLSPI	1	240	0.23*	0.20	0.34		
Moderator [Publication year of the research]							**40.29***
1980–1984	1	6488	0.23	−0.23	0.61		
1985–1989	2	197	−0.24	−0.56	0.13		
1990–1994	2	530	0.00	−0.33	0.32		
1995–1999	8	7328	0.30*	0.13	0.45		
2000–2004	13	3134	−0.07	−0.20	0.06		
2005–2009	13	4141	0.40*	0.28	0.51		
2010–2015	21	4573	0.34*	0.24	0.44		
Moderator [Culture]							**1.43**
Vertical-collectivist	23	6809	0.28*	0.18	0.38		
Horizontal-individualistic	37	19528	0.20*	0.12	0.28		

*$p < 0.05$

$p > 0.05$), the effect of learning style on academic achievement was medium for both papers [$r = 0.28$] and theses [$r = 0.16$].

The findings supported hypothesis H_3 which formulated that the sample plays a moderator role in the effect size of the learning style on academic achievement. The moderator analysis revealed that the effect size differences of the various samples were statistically significant ($Qb = 8.82$, $p < 0.05$). According to this result, in high school [$r = 0.28$], middle school [$r = 0.30$] and university [$r = 0.26$] learning styles have a medium effect on achievement; whereas the effect of learning style on achievement was not found to be significant for college and elementary school.

The moderator analysis supported hypothesis H_4 which formulated that the school subject used for measuring academic achievement play a moderator role in the effect size of learning style on academic achievement. It was found that learning style has medium effect on students' academic achievement in biology [$r = 0.78$], accounting [$r = 0.62$], economics [$r = 0.58$], mathematics [$r = 0.41$] and foreign language [$r = 0.38$], reading [$r = 0.22$] and science [$r = 0.29$] courses, whereas it has a small effect in GPA [$r = 0.17$]. On the other hand, no significant effect of learning style has been detected in agriculture, English, history, humanities, non-technical, psychology, social science, technical, Turkish and vocabulary courses. According to the moderator analysis conducted through a random effect model, the effect size of learning style on academic achievement is different for each course, and, therefore, the effect size differences among the courses used to measure academic achievement are statistically significant ($Qb = 85.11$, $p < 0.05$).

As it can be seen from the findings in the table, hypothesis H_5 which formulated that the data collection tool plays a moderator role in the effect size of learning style on academic achievement was confirmed. The moderator analysis showed that the effect size differences of the various data collection tools were statistically significant ($Qb = 14.27$, $p < 0.05$). Accordingly, it was found that the effect of learning style on academic achievement was medium or large for LSI (Nigro) [$r = 0.60$], LSA [$r = 0.47$] and LSI (Burke and Dunn) [$r = 0.33$] scales. The effect of LSI (Kolb) Learning Style Inventory, which is the most widely used measurement tool in research, is medium, whereas the effect of LSI (Grasha and Riechmann), which is another frequently used measurement inventory, was not found to be significant [$r = 0.13$].

The study supported hypothesis H_6 which formulated that the publication year of the research plays a moderator role in the effect size of learning style on academic achievement. According to the moderator analysis, the effect size differences among the different publication years are statistically significant ($Qb = 40.29$, $p < 0.05$). In this regard, it was found that learning style had a medium effect on academic achievement in the studies published between 1995 and 1999 [$r = 0.30$], 2006–2010 [$r = 0.40$] and 2011–2015 [$r = 0.34$]. On the other hand, no significant effect has been found in the studies published between 1980 and 1984, 1985–1989, 1990–1994 and 2000–2004 ($p > 0.05$).

The study did not support hypothesis H_7 which formulated that culture plays a moderator role in the effect size of learning style on academic achievement. According to the moderator analysis, the effect size differences of the countries/cultures examined are not statistically significant ($Qb = 1.43$, $p > 0.05$). On the other hand, the effect of learning style on academic achievement was found to be statistically significant in the publications related to both vertical-collectivist [$r = 0.28$] and horizontal-individualistic [$r = 0.20$] countries ($p < 0.05$).

19.4 Conclusion

The effect of learning types/styles on student achievement was examined in this meta-analysis study. A total of 443 research studies were collected during the literature review, out of which 60 were included in the meta-analysis. The 60 research studies were compiled to obtain a sample size of 26,391 subjects. The results of the random effect model showed that learning types/styles have a *medium-level positive effect* on student achievement. The moderators identified for the study were type of publication, sample group, school subject, tools of data collection, the year of the studies and culture, of which sample group, school subject, tools of data collection and the year of the studies were found to be the moderator variables.

One of the most important concepts related to individual differences is the concept of learning style. Researchers indicate that the identification of individuals' learning styles can help people to become more successful in their learning, and it allows the educators to arrange personalized learning processes (Claxton 1990). The review of the research results showed that the hypothesis which formulated that the publication type plays a moderator role in the effect of learning style on academic achievement was not supported. Even though the difference between the effect sizes of the two publication types was not statistically significant according to the moderator analysis, the effect of learning style on academic achievement was positive in both papers and theses.

Moreover, the moderator analysis revealed that the effect size differences of the sample groups were statistically significant. According to this result, learning styles in high school, middle school and university have a medium effect on achievement; whereas the effect of learning style on academic achievement was not found to be significant for college and elementary school.

In addition, it has been found that the courses used for measuring academic achievement play a moderator role in the effect size of learning style on academic achievement. It was found that learning style has a medium effect on students' academic achievement in biology, accounting, economics, mathematics and foreign language courses, whereas it has a small effect in GPA, reading and science courses. On the other hand, no significant effect of learning style has been detected in agriculture, English, history, humanities, non-technical, psychology, social science, technical, Turkish and vocabulary courses.

There are two main reasons for which it is important to measure learning styles. The first of them is that we can obtain in this way valid and reliable data about a person's individual features which we can share with him and compare with other people's characteristics. The second objective is that we can help people to select appropriate learning materials since individuals are usually not aware of their own learning style. The most widely used way of measuring learning styles is self-assessment scales (Şimşek 2007).

When we review the literature on learning styles, we can see that there are many learning style models. According to Coffield's research conducted in 2004, there were approximately 71 learning style models that were frequently used. These were the scales which were both reliable and valid. In addition to them, there are many scales lacking reliability and validity. Most of the learning style models are of the same kind and they use similar measurements. The expansion of the learning styles research field has brought numerous concepts and assessment tools. The most important problem of the researchers who are interested in learning styles is to decide which measurement tool is better or which model is more reliable. One of the basic problems of the various models is the content of the model. This is because the concept of learning style is often defined in different terms (As cited in Şimşek 2007).

Another result of the study is that the hypothesis which formulated that the data collection tool plays a moderator role in the effect size of learning style on academic achievement was supported. The effect size differences of the various data collection tools were found to be statistically significant. The effect of LSI (Kolb) learning style inventory, which is the most widely used measurement tool in research, is medium, whereas the effect of LSI, which is another measurement inventory, was not found to be significant. The reason why the data collection tools play a moderator role may be that the various models which use the measurement tools have each different content.

The research showed that publication year plays a moderator role in the effect size of learning style on academic achievement. In this regard, it was found that learning style had a medium effect on academic achievement in the studies published between 1995 and 1999, 2006–2010, and 2011–2015. On the other hand, no significant effect has been found in the studies published between 1980 and 1984, 1985–1989, 1990–1994 and 2000–2005. The review of the literature showed that the concept of learning style was identified and integrated to the teaching process only in recent years. Learning style had a medium effect on academic achievement in the studies published between 2006 and 2010 and 2011–2015, which shows that the use of teaching techniques based on learning styles started having an effect during these time periods. Many researchers have used the concepts of cognitive or learning style from a historical perspective. This trend may have limitations about the theory and the learning styles inventories that were developed. Recent research focuses on brain, multiple intelligence, creativity, and educational values. Style studies can be considered through these concepts. On the other hand, there are many inventories that carry the same name but they measure different skills.

One of the major points that should not be forgotten and should be considered while assessing learning styles is that our personal learning styles may change according to the education that we receive through our life. Learning styles also vary according to regional differences. Cognitive processes, environment, motivation, biological faculties, imagination, social interaction and teaching techniques may affect learning as well. For this reason, the variable of culture was also considered as a moderator. The study showed that the culture variable does not play a moderator role in the effect size of learning style on academic achievement. On the other hand, the effect of learning style on academic achievement was found to be statistically significant in the publications related to both vertical-collectivist and horizontal-individualistic countries.

References

Note. "*" References marked with an asterisk indicate studies included in the meta–analysis. The in–text citations to studies selected for meta–analysis are not followed by asterisks.

Ahmad, N. A., Jelas, Z. M., & Ali, M. M. (2011). The relationship between learning styles and strategies with academic achievement based on gender and type of school. *International Journal of Learning, 17*(10), 265–278.*

Akça, F. (2013). An investigation into the academic success of prospective teachers in terms of learning strategies, learning styles and the locus of control. *Journal of Education and Learning, 2*(1), 134–146.*

Alumran, J. I. (2008). Learning styles in relation to gender, field of study, and academic achievement for Bahraini university students. *Individual Differences Research, 6*(4), 303–316. *

Bailey, P., Onwuegbuzie, A. J., & Daley, C. E. (2000). Using learning style to predict foreign language achievement at the college level. *System, 28*(1), 115–133.*

Bilgin, İ., & Bahar, M. (2008). Sınıf öğretmenlerinin öğretme ve öğrenme stilleri arasındaki ilişkinin incelenmesi. *Gazi Üniversitesi Gazi Eğitim Fakültesi Dergisi, 28*(1), 19–38.

Bilgin, İ., & Durmuş, S. (2003). Öğrenme Stilleri ile Öğrenci Başarısı Arasındaki İlişki Üzerine Karşılaştırmalı Bir Araştirma. *Educational Sciences: Theory & Practice, 3*(2), 381–400.*

Borenstein, M., Hedges, L. V., Higgins, J., & Rothstein, H. R. (2009). Publication bias. *Introduction to meta-analysis*, 277–292.

Boydak, A. (2001). *Öğrenme stilleri*. İstanbul: Beyaz Yayınları.

Bozkurt, N. (2013). An examination of the links between pre-service teacher's metacognitive level, learning styles and their achievement of history class. *Procedia-Social and Behavioral Sciences, 93*, 1634–1640.*

Busato, V. V., Prins, F. J., Elshout, J. J., & Hamaker, C. (1998). The relation between learning styles, the Big Five personality traits and achievement motivation in higher education. *Personality and individual differences, 26*(1), 129–140.*

Busato, V. V., Prins, F. J., Elshout, J. J., & Hamaker, C. (2000). Intellectual ability, learning style, personality, achievement motivation and academic success of psychology students in higher education. *Personality and Individual differences, 29*(6), 1057–1068.*

Cesur, M. O., & Fer, S. (2011). A model explaining relationships between language learning strategies, learning styles and success in reading comprehension. *Journal of Education, 41*, 83–93.*

Chen, C. P., Lee, C. Y., & Tsai, P. L. (2010). Exploring the relationship between learning styles, students behaviors in a class and academic achievements of students in the department of machinery in vocational schools. *International Journal of Learning, 17*(8), 205–216.*

Claxton, C. S. (1990). Learning style, minority students and effective education. *Journal of Developmental Education, 14*(1), 6–8.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Hillside, NJ: Lawrence Erlbaum Associates.

Curry, L. (2000). Review of learning style, studying approach, and instructional preference research in medical education. *International Perspectives on Individual Differences, 1,* 239–276.

Davis, S. E. (2007). *Effects of motivation, preferred learning styles, and perceptions of classroom climate on achievement in ninth and tenth grade math students* (Doctoral dissertation). University of Florida, ProQuest Dissertations Publishing, (UMI Number: 3271121).*

Dunmire, L. J. (1987). *The relationship between learning styles and cognitive achievement of associate degree nursing students*. University of Wyoming, ProQuest Dissertations Publishing, (UMI Number: EP23491).*

Dyer, J. E. (1995). *Effects of teaching approach on achievement, retention, and problem-solving ability of Illinois agricultural education students with varying learning styles* (Doctoral dissertation). University of Illinois at Urbana-Champaign, ProQuest Dissertations Publishing, (UMI Number: 9543575).*

Elliott, K. M. (2006). *The effects of personality and learning style on the achievement of adult learners in community college online education: An investigation based on the myers-briggs type indicator and the Kolb learning styles inventory*. Capella University, ProQuest Dissertations Publishing, (UMI Number: 3233723).*

Englander, F., Terregrossa, R. A. & Wang, Z. (2011). The role of learning styles in student achievement in an MBA economics course. *International Journal of Education Research, 6*(2), 23–35.*

Fan, K. K., Xiao, P. W., & Su, C. H. (2015). The effects of learning styles and meaningful learning on the learning achievement of gamification health education curriculum. *Eurasia Journal of Mathematics, Science & Technology Education, 11*(5), 1211–1229.*

Felder, R. M., & Silverman, L. K. (1988). Learning and teaching styles in engineering education. *Engineering Education, 78*(7), 674–681.

Giordano, J. L. (2005). *Analysis of the learning styles of community college first-year, traditional versus nontraditional business students by achievement, age, gender, and geographic origin*. ST. John's Unıversıty, ProQuest Dissertations Publishing, (UMI Number: 3349133).*

Hedges, L. V., & Olkin, I. (1985). *Statistical method for meta-analysis*. United Kingdom: Academic.

Husch, D. S. (2001). *An investigation of the relationships between learning styles, personality temperaments, mathematics self-efficacy, and post-secondary calculus achievement*. The University of Tennessee, ProQuest Dissertations Publishing, (UMI Number: 3012645).*

Jahanbakhsh, R. (2012). Learning styles and academic achievement: A case study of Iranian high school girl's students. *Procedia-Social and Behavioral Sciences, 51*, 1030–1034.*

Keefe, J. W. (1979). Learning style: An overview. *Student Learning Styles: Diagnosing and Prescribing Programs, 1,* 1–17.

Keefe, J. W., & Ferrell, B. G. (1990). Developing a defensible learning style paradigm. *Educational Leadership, 48*(1), 57–61.

Kolb, D. A. (1981). Learning styles and disciplinary differences. In A. Chickering (Ed.), *The modern American college*. San Francisco, CA: Jossey Bass.

Komarraju, M., Karau, S. J., Schmeck, R. R., & Avdic, A. (2011). The Big Five personality traits, learning styles, and academic achievement. *Personality and Individual Differences, 51*(4), 472–477.*

Kulinskaya, E., Morgenthaler, S., & Staudte, R. G. (2008). *Meta analysis: A guide to calibrating and combining statistical evidence*. London: Wiley.

Leone, C. R. (2008). *Effects of more-versus less-congruent parental/child learning styles on the vocabulary achievement, comprehension, and attitudes of fourth-through sixth-grade students involved in a homework-support process*. ST. John's Unıversıty, ProQuest Dissertations Publishing, (UMI Number: 3340428).*

Littin, R. M. (2001). *Relationship (s) between and among an urban elementary school's grades three through five students' learning styles, cognitive styles, reading achievement, hemispheric preference, and gender.* St. John's University, ProQuest Dissertations Publishing, (UMI Number: 3034485).*

Loo, R. (2002). A meta-analytic examination of Kolb's learning style preferences among business majors. *Journal of Education for Business, 77,* 252–256.

Nigro, G. (1998). *Learning styles and personality traits associated with student success at the grade 9 level in an individualized study program*. University of Toronto, ProQuest Dissertations Publishing, (UMI Number: 0612341542).*

Omar, N., Mohamad, M. M., & Paimin, A. N. (2015). Dimension of learning styles and students' academic achievement. *Procedia-Social and Behavioral Sciences, 204*, 172–182.*

O'Neill, W. J. (1989). Relationship of match/mismatch of student-teacher learning styles, stress, and academic achievement. Iowa State University, ProQuest Dissertations Publishing, (UMI Number: 9003552).*

Rahr, R. R. (1987). *Basic learning styles and the relationships to achievement in allied health and nursing*. University of Houston, ProQuest Dissertations Publishing, (UMI Number: 8811028).*

Rezaeinejad, M., Azizifar, A., & Gowhary, H. (2015). The study of learning styles and its relationship with educational achievement among Iranian high school students. *Procedia-Social and Behavioral Sciences, 199*, 218–224.*

Roberts, E. G. (1999). *Comparison of primary vs. supplementary delivery of instruction via the World Wide Web and learning styles in an undergraduate agricultural communication course: Effects on achievement and attitude*. Mississippi State University, ProQuest Dissertations Publishing, (UMI Number: 9946350).*

Sandler. I. B. (1983). *The relatıonshıp of psychologıcal androgyny, field ındependence, and pıagetıan cognıtıve development to the learnıng styles of gıfted and nongıfted kilddle school students as examıned by achıevement, sex, and grade level.* Temole University, ProQuest Dissertations Publishing, (UMI Number: 83212/4).*

Sapancı, A. (2014). Öğretmen adaylarının öğrenme stilleri ile akademik başarıları arasındaki ilişki. *E-AJI (Asian Journal of Instruction), 2*(2), 60–68.

Shaughnessy, M. F. (1998). An interview with Rita Dunn about learning styles. *Clearing House, 71*(3), 141–146.

Shay, B. (1994). *The relationship between learning styles and achievement for high school students in vocational education programs*. Hofstra University, ProQuest Dissertations Publishing, (UMI Number: 9425245).*

Shih, C. C. (1998). *Relationships among student attitudes, motivation, learning styles, learning strategies, patterns of learning and achievement: A formative evaluation of distance education via web-based courses*, Iowa State University, ProQuest Dissertations Publishing, (UMI Number: 9911641).*

Şimşek, Ö. (2007). Marmara öğrenme stilleri ölçeği'nin geliştirilmesi ve 9–11 yaş çocuklarının öğrenme stillerinin incelenmesi. Yayımlanmamış Doktora Tezi. Marmara Üniversitesi. Eğitim Bilimleri Enstitüsü.

Snyder, R. (1999). The relationship between learning styles/multiple intelligences and academic achievement of high school students. *The High School Journal, 83*(2), 11–20.

Solomon, C. (1996). *The relationship among psychosocial development, learning styles, and educational achievement of African American entering college freshmen*. University of Maryland. ProQuest Dissertations Publishing, (UMI Number: 9808698).*

Sriphai, S., Damrongpanit, S., & Sakulku, J. (2011). An investigation of learning styles influencing mathematics achievement of seventh-grade students. *Educational Research and Reviews*, *6* (15), 835–842.*

Suliman, W. A. (2010). The relationship between learning styles, emotional social intelligence, and academic success of undergraduate nursing students. *Journal of Nursing Research*, *18*(2), 136–143.*

Terregrossa, R. A., Englander, F., Wang, Z., & Wielkopolski, T. (2012). How college instructors can enhance student achievement: Testing a learning styles theory. *International Journal of Education Research, 7*(1), 1–15.*

Terregrossa, R., Englander, F., & Englander, V. (2009). The impact of learning styles on achievement in principles of microeconomics: A natural experiment. *College Student Journal, 43*(2), 400–410.*

Treacy, A. L. (1996). *Learning styles, feelings and beliefs about technology and mathematics achievement*. Claremont Graduate School, ProQuest Dissertations Publishing, (UMI Number: 9612320).*

Williams, J. L. (2008). *The relationship between learning styles and student performance on the Palmetto Achievement Challenge Test in a low performing, low socioeconomic-status school*. The University of Southern Mississippi, ProQuest Dissertations Publishing, (UMI Number: 3326732).*

Williams, R. A. (2001). *Learning styles and achievement motivation of community college students*. Walden University, ProQuest Dissertations Publishing, (UMI Number: 3005850).*

Chapter 20
Conclusion and Limitations

Engin Karadağ

20.1 Conclusion

In this meta-analysis research, the studies in the literature which literature which examine the predictors of student achievement are statistically analyzed. Table 20.1 presents the results of the meta-analysis regarding the relationship between student achievement and 18 variables. A sample of 2.292.720 people was collected utilizing 2138 research studies in order to determine the impact level of 20 variables on student achievement. The findings show that motivation, anxiety, self-regulation, self-esteem, parent involvement, goal orientation and learning types/styles have a low impact on student achievement. On the other hand, it was found out that attitude, self-efficacy, self-concept, school culture, school climate, collective teacher efficacy, expectations and the leadership behaviors of school principals have a moderate impact on student achievement while socio economic status has a high impact on student achievement. In addition, locus of control and social adjustment have no impact on student achievement, and the variable of anxiety has a negative impact. A narrow confidence interval found for the meta-analytic research study indicates that the results of the studies included in the research are reliable. This finding can be considered important because it provides the opportunity to make reliable decisions regarding the strength and direction of the relationships found in the meta-analysis.

Having contributed to the educational settings by examining the factors affecting the achievement, a similar study has been conducted by John Hattie, who owns one of the pioneer works about learning outcomes. Hattie (2009) synthesized the results of more than fifteen years research—including over 800 meta-analysis studies- and represented a wide collection of evidence-based research related to the influences on student achievement, whose main contributors are classified as the student,

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Table 20.1 Findings of the correlations between student achievement and variables: results of the meta-analysis

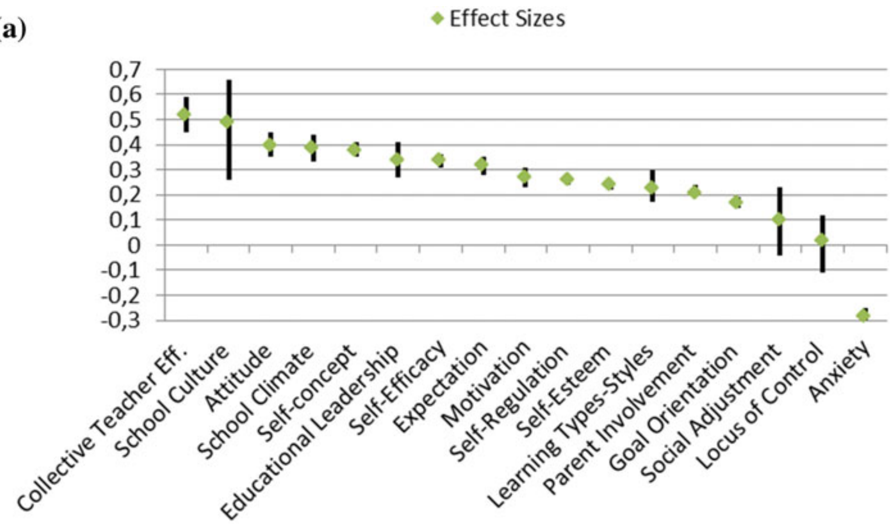
Variables	k	N	*r/D*	CI		*Q*
				Lover limit	Upper limit	
Educational leadership	57	28964	.34	.27	.41	1954.01*
Motivation	214	551120	.28	.24	.31	33997.2*
Attitude	90	78015	.40	.35	.45	4737.9*
Anxiety	151	115086	−.28	−.30	−.25	2087.64*
Self-efficacy	231	242023	.34	.31	.36	9116.0*
Self-concept	123	223068	.38	.35	.41	6268.0*
Self-regulation	346	215452	.26	.24	.28	4095.8*
Locus of control	23	18918	.02	−.11	.12	897.7
Socioeconomic status (SES)	66	–	−.90	−1.03	−.76	10044.3*
School culture	51	66391	.49	.26	.66	51215.9*
School climate	90	148504	.38	.33	.43	12385.1*
Collective teacher efficacy	35	2087	.52	.45	.59	130.3*
Expectation	126	104926	.32	.28	.35	4240.6*
Self-esteem	46	27419	.24	.22	.25	1002.6*
Social adjustment	24	5096	.10	−.04	.23	482.1
Parent involvement	251	378069	.21	.19	.24	14849.7*
Goal orientation	154	61191	.17	.15	.19	1077.2*
Learning types/Styles	60	26391	.23	.17	.30	1603.3*

home, school, curriculum, teacher, and teaching and learning experiences. He examined the influences taking place in these categories to reveal the ones having the greatest impact on achievement. Present study adds to Hattie's (2009) work in that this study searched for what really works in educational settings to improve learning in a macro-level, including the seemingly important and often-studied factors, while Hattie (2009) examined the micro-level contributors of achievement. We hope these macro-level factors catch the attention of practitioners as well as researchers. With this in mind, we summarize the results of our study visually in Fig. 20.1a, b, with a similar way Hattie (2009) did. Figure 20.1a represents the effect sizes on an upper and lower limit range based on the confidence intervals, decreasingly from left to right. On the other hand, Fig. 20.1b indicates the actual effect sizes in a decreasing way.

As it can be seen in Fig. 20.1a, b, the most powerful factors on student achievement are the ones related to the school and teacher. The personal factors take place in the next phase. Hence, the school community should work together to get better school outcomes. Especially, a healthy communication between teachers

Fig. 20.1 **a** Effect sizes of the correlational factors of achievement with confidence intervals, **b** actual effect sizes of the correlational factors of achievement. *Note* SES is excluded from the figures, since its effect size was not correlational ►

(a)


Effect Sizes
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0
-0,1
-0,2
-0,3
Collective Teacher Eff.
School Culture
Attitude
School Climate
Self-concept
Educational Leadership
Self-Efficacy
Expectation
Motivation
Self-Regulation
Self-Esteem
Learning Types-Styles
Parent Involvement
Goal Orientation
Social Adjustment
Locus of Control
Anxiety

(b)

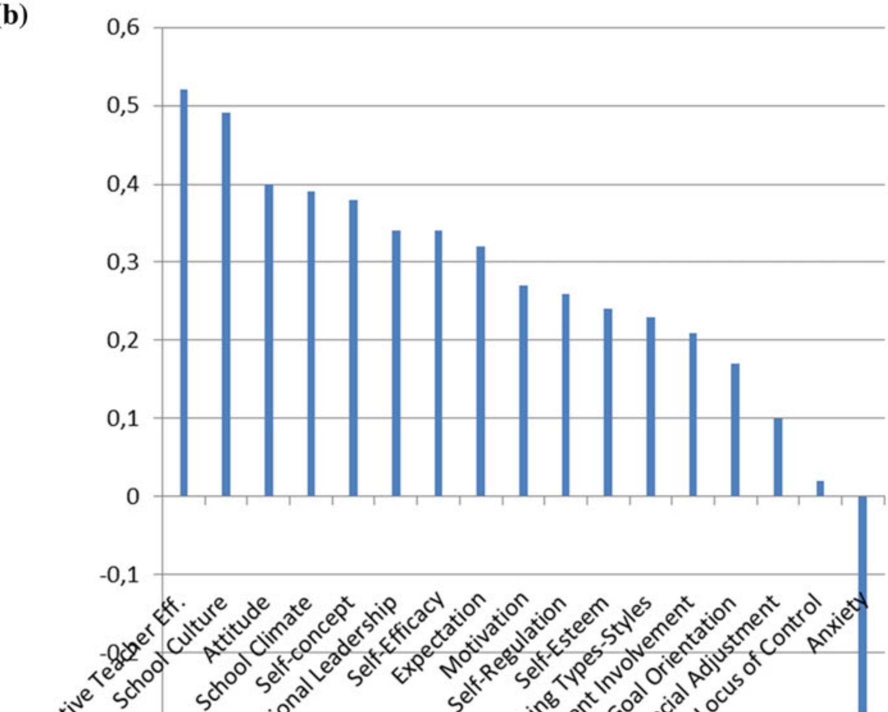

0,6
0,5
0,4
0,3
0,2
0,1
0
-0,1
-0,3
Collective Teacher Eff.
School Culture
Attitude
School Climate
Self-concept
Educational Leadership
Self-Efficacy
Expectation
Motivation
Self-Regulation
Self-Esteem
Learning Types-Styles
Parent Involvement
Goal Orientation
Social Adjustment
Locus of Control
Anxiety

Table 20.2 Findings on the correlations student achievement and variables: results of the moderator analysis

Variables	Moderatörler				
	Type of publication	Year of publication	Country culture	The course	The education level
Educational leadership					
Motivation	+				+
Attitude	+	+		+	+
Anxiety	+	+			
Self-efficacy	+	+	+	+	
Self-concept	+				+
Self-regulation	+	+	+		+
Locus of control			+		
Socioeconomic status (SES)	+	+		+	+
School culture		+			
School climate		+			
Collective teacher efficacy					
Expectation		+		+	+
Self-esteem		+			
Social adjustment			+		
Parent involvement			+		
Goal orientation			+		
Learning types/ styles		+		+	

and students during the classroom activities requires quality in teacher-student relationship. Furthermore, when personal factors of students themselves taken into consideration, teachers should encourage and motivate and support their development to get better results in achievement. In sum, Fig. 20.1a, b tell us about the importance and contributiveness level of the study factors on student achievement and inform us about what actually works in schools to improve learning in a holistic way.

Table 20.2 presents the results of moderator analysis which looked at the relationship between student achievement and 20 variables.

Type of Publication; it is a moderator for the effect of motivation, attitude, anxiety, self-efficacy, self-concept, self-regulation and socio-economic status (SES) on student achievement. The differences in average effect size are seen more in the variables of motivation, attitude, anxiety, self-efficacy and SES mentioned in research articles, and these differences also correlate to a great extent with self-concept and self-regulation in doctoral dissertations. For instance, the effect of motivation on SES is found higher in papers than dissertations. These findings point out towards a possible bias in the publications that focus on student achievement. Moreover, this finding also shows that studies that do not result in the predicted outcome (the effect of the examined variable on student achievement) have a lower possibility of publication.

Year of Publication; it is a moderator for the effect of attitude, anxiety, self-efficacy, self-regulation, SES, school culture, school climate, self-esteem, social adjustment and learning types/styles on student achievement. The differences in average effect size correlate highly with all the variables in the studies examined. These findings show that student achievement is more affected today by both the characteristics and behaviors of students and the relevant stakeholders.

The culture in which the study was conducted; it is a moderator for the effect of self-efficacy, self-regulation, and locus of control, parent involvement, goal orientation and expectation on student achievement. The differences correlate highly with all the variables in vertical-individualist countries. The students in vertical-individualist societies are more independent individuals in terms of personality traits and therefore this highly affect students' success.

The course subjects examined in the study; it is a moderator for the effect of attitude, self-efficacy, SES, self-esteem and learning types/styles on student achievement. The differences in average effect size differ to a large extent in terms of variables. These findings are related to the content of the various courses and the abilities of students.

The level of school in which the study was conducted; it is a moderator for the effect of motivation, attitude, self-concept, self-regulation, SES and self-esteem on student achievement. The differences in average affect size are seen more in primary and secondary schools in almost all variables. These findings show that the achievements of students from lower grades are affected by more variables.

When the research results are considered, the average effect size of the identified variables of this research on students' achievement has been calculated by gathering data from different samples and through different measuring tools. The meta-analysis shows that motivation, anxiety, self-regulation, self-esteem, parent involvement, goal orientation and learning types/styles have a low impact on student achievement whereas attitude towards the course, self-efficacy, self-concept, school culture, school climate, collective teacher efficacy, expectation and the leadership behaviours of school principals have a moderate impact. Finally, socioeconomic status has a high impact on achievement. The variables affecting student achievement can be grouped under two groups: variables about (*i*) students and about (*ii*) stake holders, and these can be further divided into five groups (variables about (*i*) students, (*ii*) parents, (*iii*) teachers, (*iv*) schools and (*v*) school principals). The most important findings of the research are that the variables related to parents, such as the SES, have a high impact and that the variables related to schools, such as the school climate and school culture, have a moderate impact on student achievement.

20.2 Limitations of the Study

This study was conducted based on current data obtained from original research studies. Possibly the biggest disadvantage of the study was that the data were based only on correlational studies. This feature introduces a potential methodological bias. The opinion that quantitative research methods may be more effective in explaining the nature of student achievement and variables serves as the basis for the argument that the results of this study cannot sufficiently explain the causal effects of the results.

Despite the strategies developed to select the research studies subsequently included in the meta-analysis, it was not possible to access all of the research studies. The reason for this is twofold: (*i*) the ScienceDirect, ProQuest and EBSCO academic databases solely provide access to the full text of publications written in the English language—therefore, it was not possible to reach research studies written in other languages; and (*ii*) all dissertations used in the study were from American and Canadian universities, thereby introducing the possibility of a cultural bias.

The correlational values from research studies that generally assessed constructive leadership skills and organizational outputs were included in the meta-analysis. The fact that studies of destructive leadership are not yet internationally common and that the number of studies are limited have an effect on this situation. Therefore, the meta-analytic studies were not designed to draw conclusions on destructive leadership and organizational outputs; moreover, destructive leadership on organizational outputs may have a higher degree of explanatory power. Thus, to include both constructive and destructive leadership and organizational outputs in a meta-analysis may provide more detailed information with which to explain concepts.

Reference

Hattie, J. (2009). *Visible learning: A synthesis of over 800 meta-analyses relating to achievement*. London: Routledge.

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