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

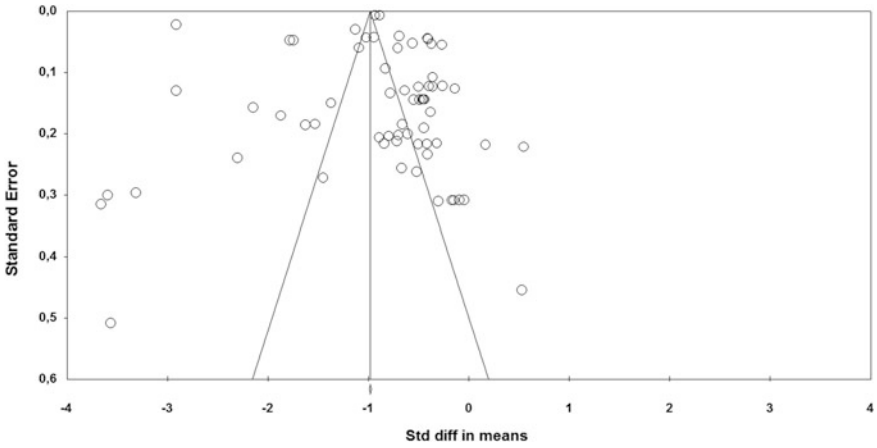

Fig. 10.1 Effect size funnel for publication bias

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.

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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.

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