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The Relationship of Preschool Attendance with Academic Achievement and Socioeconomic Status in Turkey

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Abstract

Preschool education plays a critical role in mitigating the opportunity gap between children through providing basic skills in early childhood. Within this scope, the G20 countries have implemented diverse policies to increase preschool attendance in their respective contexts. Turkey took solid steps to expand preschool education after 2010, leading to a significant increase in schooling rates. However, studies show that attendance in preschool education is still strongly linked with students' socioeconomic status (SES) in Turkey. Thus, the present study aims to evaluate the relationship between preschool education attendance and students' academic achievement in Turkey, and to determine the role of SES within this relationship. PISA and TIMSS data were used to study this relationship across age levels. Differences between schooling rates were analyzed with the z-ratio test for independent groups, and the significance of the differences between group means was analyzed through MANCOVA. The findings showed that access to preschool education increased significantly over the years, but despite these improvements, preschool attendance continued to be linked with SES. Students in higher SES quartiles demonstrated both higher schooling rates and longer participation in preschool education. The findings consistently indicated significant differences in preschool attendance between SES groups. While there were significant relationships between preschool attendance and academic achievement, these relationships were strongest for students aged 10–11. The relationship between preschool attendance and literacy for 15-year-old students was also significant, but the strength of this relationship was relatively weak. Lastly, this study revealed that the strength of the relationship between preschool education attendance and academic achievement decreases when SES is controlled. The results emphasized the importance of the recent steps taken by Turkey's Ministry of National Education to increase access to preschool education.

Keywords: preschool education, academic achievement, socioeconomic status, educational equality

Introduction

Early childhood is a unique period where students' learning capacity and ability to acquire new skills are maximized (Organisation for Economic Co-operation and Development [OECD], 2017, 2020). The skills acquired in early childhood form a critical foundation for children's future knowledge development in school and beyond (Bakken et al., 2017; Trawick-Smith, 2014; United Nations International Children's Emergency Fund [UNICEF], 2019). The high skill acquisition capacity in early childhood makes this period critical for the development of the individuals (OECD, 2020; UNICEF, 2019). Research has indicated that children who have greater opportunities for learning and socialization during this period experience gains in developmental capacity as well (Bronfenbrenner, 1992; Darragh, 2006; Kirk, 2003).

Preschool education (and all early childhood education, from a more comprehensive perspective) aims to prepare children for school life by facilitating their acquisition of self-care skills to become life-long learners (OECD, 2020). In its early stages, preschool education largely focused on caring for the children of working women, but it has evolved over time to transform into a formal education level in its own right (Kamerman, 2006; Özer et al., 2021a). Studies of children's learning capacity in early childhood indicate that high quality education in this period provides significant academic and social contributions (Bustamante et al., 2021; Eğitimde Reform Girişimi ve Anne Çocuk Eğitim Vakfı [ERG & AÇEV], 2017; Health Affairs, 2019; McCoy et al., 2017). The importance attributed to preschool education has

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increased with further research, along with this level of education's unique standards and pedagogical practices (Cahan, 1989).

Preschool education, which has become embedded in many education systems, provides both short- and long-term benefits to students. Studies revealed that students who attend preschool demonstrate significantly higher academic achievement across time (Anasız et al., 2018; Cortazar et al., 2020; Gardinal-Pizato et al., 2012; McCoy et al., 2017; Smith, 2014). Additionally, these students have higher school completion rates (Earle et al., 2018) and show fewer negative behaviors like dropouts and grade repetition (Barnett, 1998; Cortazar et al., 2020).

The benefits of preschool attendance are not limited to cognitive skills. Research has shown that students who attend preschool have higher school readiness (Erkan & Kırca, 2010; Kırca, 2007) and use their social-emotional skills in diverse environments more frequently (Gülay et al., 2011). Preschool attendance also increases the total education time of students (just under 1 year, on average) and enables them to benefit from school opportunities for a longer period (UNICEF, 2019).

The dissemination of preschool services is also important for societal benefits and welfare. In countries where preschool education is not universalized students from high SES backgrounds are more likely to attend this level of education than their low-SES peers (Bassok et al., 2016; Correia-Zanini et al., 2018). This increases the already significant advantages of children from higher-SES schools. This perpetuates the Matthew Effect of education, where past disadvantages increase future disadvantages (Özer & Perc, 2020, 2021). On the other hand, socioeconomically disadvantaged students have lower attendance rates in preschool education and thus benefit less from these educational opportunities. This is an important issue for educational equality because students from disadvantaged SES backgrounds gain a greater benefit from preschool education than their peers from higher SES homes (Berlinski et al., 2008; Fahmi & Jewelery, 2015; OECD, 2020).

The clear impact of preschool education on educational outcomes has led to the global dissemination of preschool educational institutions and programs (Earle et al., 2018; OECD, 2020). Investments in preschool education have boosted globally, especially in the G20 countries. Recently, preschool has been included in compulsory education in some countries, such as South Africa (OECD, 2020). In many developed countries, such as France, Italy, and the United Kingdom, preschool education has almost universalized, and most of the target population benefit from preschool services (OECD, 2020).

The short- and long-term contributions of preschool education to student outcomes have increased the interest of economists in this area (Bartik, 2011; Karoly, 2016; Magnuson & Duncan, 2016; Rolnick & Grunewald, 2003). Studies demonstrate that preschool education is the education level with the highest benefit in return for the investment (ROI) (Bartik, 2011; Rolnick & Grunewald, 2003). Karoly (2016) explained that each unit of investment made for preschool education would have a return of 3 or 4 units. Therefore, widespread adoption of preschool education not only supports equality of opportunity in education, but also provides economic benefits to society.

Like in many European countries, the development of preschool education in Turkey began with the care and education of the children of working women (Oktay, 1990). The massification of primary and secondary education later echoed through preschool education, causing schooling rates to increase in this area (Özer et al., 2021a). However, preschool education in Turkey truly began extending in the 2010s. The inclusion of preschool education in compulsory education is mentioned in national policy documents from the second and third decades of the 21st century, such as the Presidential Strategic Plan and Medium-Term Plan (ERG & AÇEV, 2017; Presidency of the Republic of Turkey Strategy and Budget Directorate, 2021). After 2010, the government's concrete steps to increase the number of classrooms, teachers, and schools contributed greatly to increasing preschool attendance (Ministry of National Education [MoNE], 2021; Özer, 2022). Concurrently, preschool education programs and curricula were updated within the scope of the "Strengthening Preschool Education Project" with UNICEF (ERG & AÇEV, 2016). All these steps led to an increase in social awareness towards preschool education in Turkey, causing the schooling rates to increase over time.

Despite major improvements in schooling rates, there remain significant differences in preschool education attendance in Turkey across student groups. Studies have revealed that socioeconomically disadvantaged students attend this education level at significantly lower rates (ERG & AÇEV, 2016, 2017). SES' apparent determining role in preschool attendance illustrates the persistence of educational inequalities nationwide. In these circumstances, SES-advantaged students can benefit greatly from preschool education, even though preschool attendance is more critical for SES-disadvantaged students. In this case, the current gap between SES-advantaged and SES-disadvantaged students widens even more. Despite the critical nature of the inequalities in preschool attendance and their relationship with academic outputs, there has been relatively limited research on this subject (Akçay, 2016; Anasız et al., 2018; ERG & AÇEV, 2016, 2017; Erkan & Kırca, 2010; Erkan & Topçu Bilir, 2015). Additionally, the current studies do not illuminate the role that SES plays in the relationship between preschool attendance and academic performance. A select few studies have controlled for the effect of SES, defined SES as another hierarchical level, or considered the possible impact of SES differences in the relationship between preschool attendance and academic performance (Ağırdağ et al., 2015; Ersan & Rodriguez, 2020). Thus, this study intends to broaden the understanding of the relationship between preschool attendance and academic achievement by providing evidence from diverse age levels and SES groups. Data from the last three cycles of the Program for International Student Assessment (PISA) and the International Mathematics and Science Trends Survey (TIMSS) were used for this purpose.

Purpose of the Study

The main aim of this study is to examine the relationship between preschool attendance and academic performance and to determine the role of socioeconomic status in this relationship. In line with this general purpose, answers to the following questions were sought:

1. Do the preschool education attendance and education period of students from different socioeconomic levels differ significantly?
    a. Does the preschool education attendance of students from different socioeconomic levels differ significantly?
    b. Is there a difference between the preschool education periods of students from different socioeconomic levels?
2. Is there a significant relationship between participation in preschool education and students' academic achievement in Turkey across the last three cycles of the TIMSS and PISA?
    a. Is there a significant difference between the mean scores of the students who attended and did not attend preschool education across the last three cycles of the TIMSS and PISA?
    b. Is there a significant relationship between participation in preschool education and academic education when socioeconomic status is controlled across the last three cycles of the TIMSS and PISA?

Method

Research Design

This study aims to determine the relationship between participation in preschool education and academic performance, as well as to identify the role that socioeconomic status plays in this relationship. The study followed a correlational design, which focused on the relationships between variables (Karasar, 2011). In coherence with the structure of correlational design, the relationships between the variables were assessed in their own context, without any external interventions. Thus, this study examined the variables of preschool education attendance and academic achievement to determine whether a

significant relationship exists between them. Concurrently, socioeconomic status (SES) served as the control variable in the study to remove its external impact on this relationship.

Population and Sample

Since the relationship between preschool attendance and academic achievement can be studied at various ages, it was important to define the population and sample of the present study according to two distinct age levels: 10-to-11-year-olds and 15-year-olds. The 10-to-11-year-old population consisted of students who were enrolled in formal education in the fourth and fifth grade in Turkey and participated in the TIMSS during the 2015 and 2019 cycles. The second population consisted of 15-year-old students who attended formal education in Turkey and participated in the PISA in 2012, 2015, and 2018. Table 1 shows the demographic distribution of students in the study samples.

Table 1

Distribution of Students in the Sample by Gender, Socioeconomic Level, and Preschool Education Attendance

		TIMSS				PISA					
		2015		2019		2012		2015		2018	
Variable	Group	f	%	f	%	f	%	f	%	f	%
Gender	Female	546,986	49.3	587,608	52.3	428,608	49.5	462,425	50.0	438,680	49.6
	Male	559,987	50.5	532,255	47.3	438,073	50.5	462,940	50.0	446,290	50.4
SES Level	1st Quartile	313,619	28.3	282,711	25.2	217,136	25.3	226,262	24.8	220,664	24.9
	2nd Quartile	282,588	25.5	268,807	23.9	213,306	24.8	228,528	25.0	220,170	24.9
	3rd Quartile	225,989	20.4	303,709	27.0	215,897	25.1	229,473	25.1	219,156	24.8
	4th Quartile	250,534	22.6	183,745	16.3	212,543	24.7	228,286	25.0	219,814	24.8
Attendance in Preschool Education	Yes	770,972	69.5	731,387	65.1	255,803	29.5	478,816	51.7	583,917	66.0
	No	297,794	26.9	288,988	25.7	605,964	69.9	411,901	44.5	283,069	32.0

As seen in Table 1, the gender distribution of the study sample is well-balanced. The number of students in the TIMSS and PISA data accurately represents the national student populations; in other words, the changes in gender and preschool education rates over time largely correspond with the official education statistics collected by the MoNE. As a result of the selection of students through two-stage stratified sampling (LaRoche et al., 2020; OECD, 2019) in the TIMSS and PISA studies, school types and student ratios in the Nomenclature of Territorial Units for Statistics (NUTS1) regions of Turkey were preserved in the sample, thus obtaining samples with high representativeness of the student population.

Data Collection and Analysis

The data used in the present study were obtained from the open international databases of the PISA and TIMSS surveys. Preschool education attendance was gathered through the "home questionnaire" employed in the 2015 and 2019 TIMSS cycles. In 2011, the home questionnaire was implemented only

in countries participating in both the TIMSS and PIRLS. Since Turkey only participated in the TIMSS in 2011, the home questionnaire was not used, and thus data on preschool education attendance were not collected that year. In the PISA, preschool education attendance data is obtained through the "student questionnaire." In this context, the data from the last three PISA cycles are included in the present study.

The socioeconomic status (SES) indicators from both the TIMSS and PISA were taken into account when examining students' SES in the present study. Students' SES is determined based on the Index of Economic, Social, and Cultural Status (ESCS) in the PISA, and Home Resources for Learning (HRL) in the TIMSS. Considering the HRL and ESCS indexes, students were grouped into four quartiles. Cumulative frequency distributions of SES were considered to form these quartiles. Mirroring the design of other large-scale international studies, the student weightings were used in both cumulative frequency distributions and multivariate analysis. The independent groups' ratio test was used to test the significance of the differences between the preschool attendance rates of students in different SES quartiles.

The significance of the differences in mean academic achievement scores of students from different SES levels was examined using Multivariate Analysis of Covariance (MANCOVA). MANCOVA enables the evaluation of the effect of independent variables on more than one dependent variable through statistically controlling external variables (Tabachnick & Fidell, 2001). The use of MANCOVA is important for two reasons. First, academic achievement indicators are expressed as possible values in item responses in theory-based large-scale studies such as the PISA and TIMSS, and researchers recommend considering all possible values for unbiased results (Arıkan et al., 2020; Rutkowski et al., 2010). MANCOVA enables simultaneous analysis of all possible values (5 possible values in the TIMSS and 10 possible values in the PISA, respectively) as dependent variables. Second, MANCOVA can be used to examine the relationship between preschool education attendance and academic achievement indicators while controlling for the effect of SES. Assumptions of MANCOVA regarding the normality and correlation between covariance and dependent variables are analyzed, and outputs are presented in Table 2.

Table 2

Normality Statistics – Skewness and Kurtosis

	TIMSS 2015				TIMSS 2019			
	Mathematics		Science		Mathematics		Science	
	Min	*Max*	*Min*	*Max*	*Min*	*Max*	*Min*	*Max*
Skewness	-0,472	-0,442	-0,559	-0,447	-0,418	-0,364	-0,699	-0,656
Kurtosis	0,120	0,298	0,178	0,440	-0,158	0,030	0,424	0,543

	PISA 2012					
	Mathematics		Science		Reading	
	Min	*Max*	*Min*	*Max*	*Min*	*Max*
Skewness	0,391	0,432	0,152	0,217	-0,016	0,008
Kurtosis	-0,206	-0,177	-0,341	-0,286	-0,221	-0,099

	PISA 2015					
	Mathematics		Science		Reading	
	Min	*Max*	*Min*	*Max*	*Min*	*Max*
Skewness	0,073	0,192	0,123	0,167	-0,140	-0,026
Kurtosis	-0,280	-0,127	-0,467	-0,367	-0,253	-0,080

	PISA 2018					
	Mathematics		Science		Reading	
	Min	*Max*	*Min*	*Max*	*Min*	*Max*
Skewness	0,125	0,195	0,057	0,109	-0,017	0,043
Kurtosis	-0,195	-0,068	-0,328	-0,191	-0,356	-0,280

As seen in Table 1, the skewness and kurtosis coefficients varied between -1 and 1 in all cycles of PISA and TIMSS. Additionally, the significant and medium-strength correlations between SES (covariant) and dependent variables coincided with the MANCOVA assumptions. Lastly, multivariate outliers are less than 2% in all dataset, and these were not removed to use Turkish sample in all cycles without any interruption.

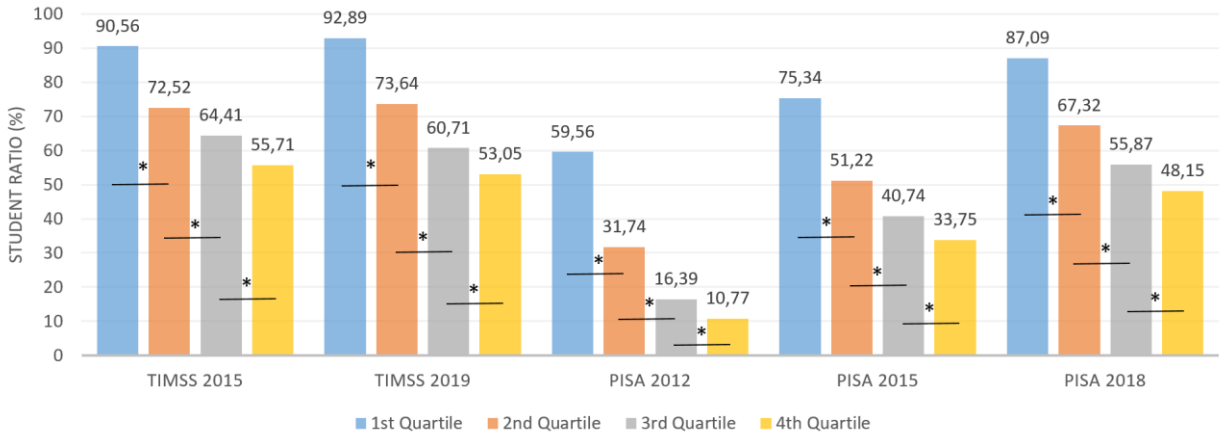
Results

The Relationship between Preschool Education Attendance and SES

Figure 1 shows the differences in Turkish preschool education attendance rates between SES quartiles in the last cycles of the TIMSS and PISA.

Figure 1

*Preschool Education Attendance of Students across Socioeconomic Status Quartiles **



**The difference between ratios are significant at 0.05 level.*

Figure 1 indicates that students' SES and preschool education attendance are significantly related. Both the TIMSS and PISA findings showed that students from higher SES quartiles have higher schooling rates than those from lower SES quartiles. For example, more than 90% of the students in the top quartile in the TIMSS attended preschool education, while the schooling rate of students in the lowest quartile remained below 60%. The differences in preschool education attendance between SES cohorts increased even more in the 15-year-old age group. In the last three PISA cycles, the rate of students attending preschool among the highest SES quartile ranged from 60% to 87%, while in the lowest quartile, it ranged from 11% to 48%.

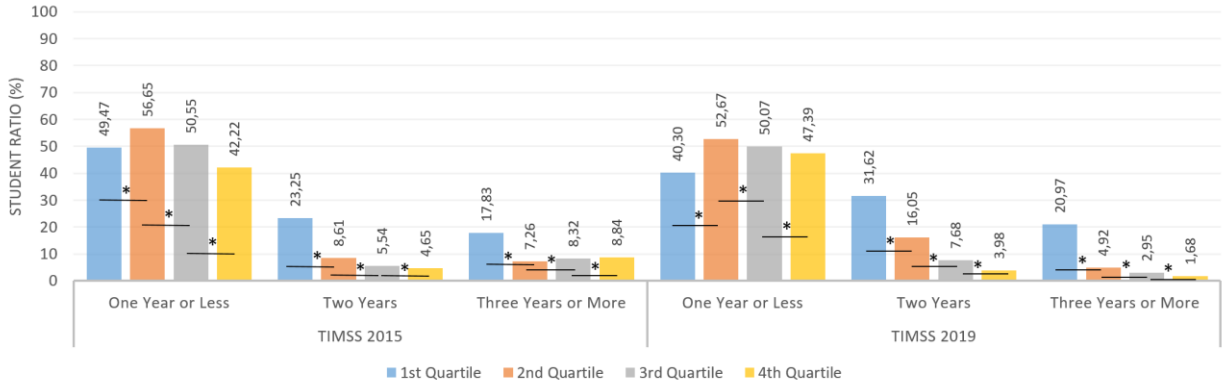
The PISA findings illustrated in Figure 1 are an important indicator of the expansion of preschool education in Turkey. In the PISA, which focuses on the 15-year-old students, the significant increase in preschool education attendance in all socioeconomic quartiles between 2012 and 2018 demonstrates the expansion of preschool education to diverse communities in Turkish society. Considering the students' age, this finding highlights the increase in access to preschool education since the beginning of the 2000s.

The change in the duration of preschool education of students from different SES quartiles is depicted in Figure 2.

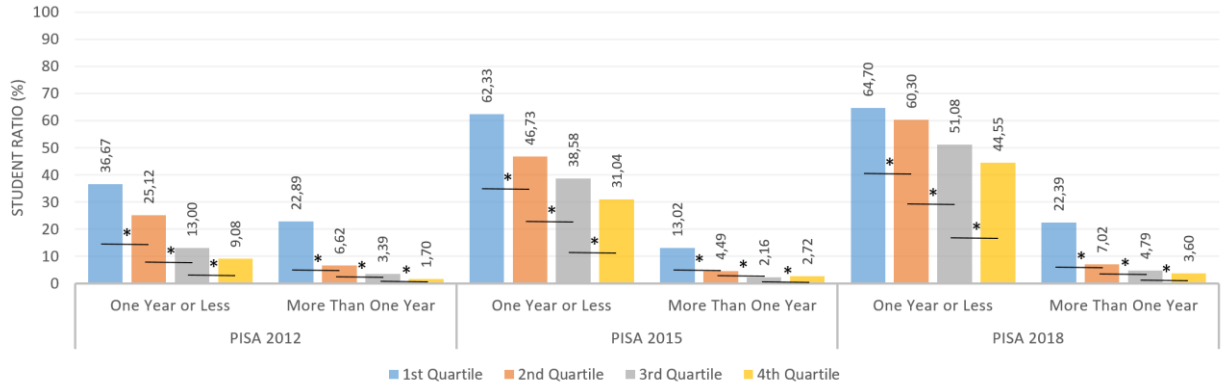
Figure 2

*Preschool Education Periods of Students from Different Socioeconomic Quartiles **

a. TIMSS Cycles



b. PISA Cycles



**The difference between ratios are significant at 0.05 level.*

Figure 2 shows that SES is also significantly related to the duration of preschool education for students in Turkey. The TIMSS and PISA findings commonly indicated that students from the highest SES quartile benefit from preschool education for a longer period than their less socioeconomically advantaged peers. The TIMSS findings revealed that the rate of students who attended preschool education for more than one year reached 31.6% in the top SES quartile, while this rate increased to 8.8% in the lowest SES quartile.

The difference between SES groups increased significantly in the PISA findings. While the rate of students who attended preschool education for more than one year ranged from 13.02% to 22.89% in the top SES quartile, it spanned 1.70% to 3.60% in the lowest SES quartile. This result is expected since the 15-year-old students represented in the PISA attended preschool between 2002 and 2008. The prevalence of preschool education was much more limited during this period, causing a greater disparity in attendance rates for students across SES quartiles. Therefore, the findings reveal that both attendance in preschool education and duration of attendance are significantly related to SES, despite the great increase in attendance rates.

The Relationship between SES and Academic Achievement

Figure 3 and Table 3 show the MANCOVA results regarding the mean achievement scores of students according to preschool education attendance and SES.

Figure 3

Average Achievement Scores According to Preschool Education Attendance and SES

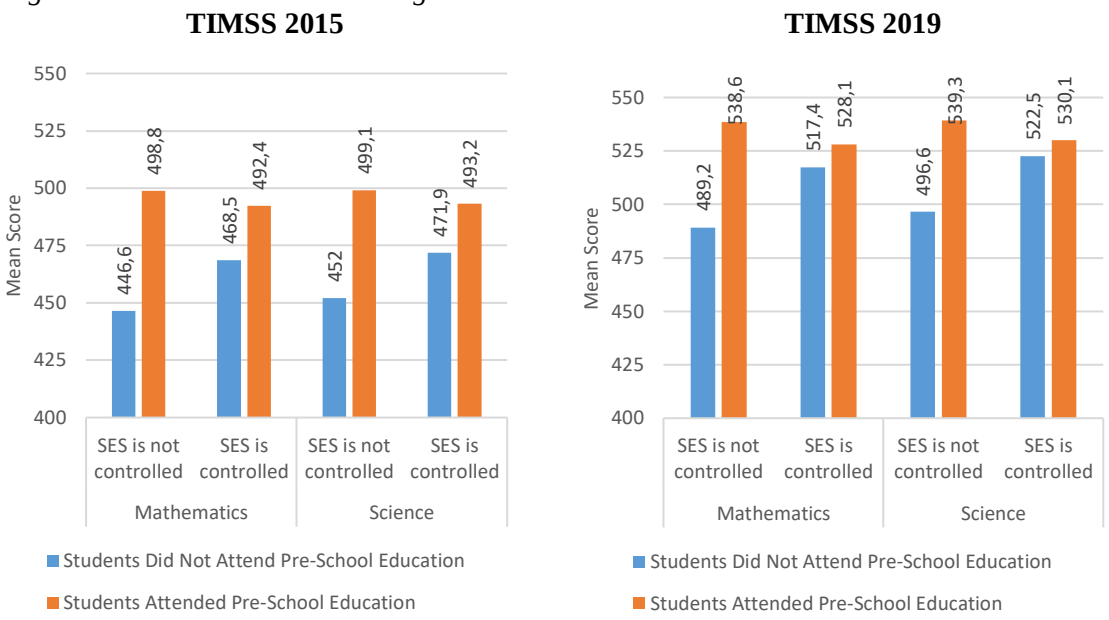


Table 3

Relationship between Preschool Education Attendance and TIMSS Achievement—MANCOVA Results

TIMSS Cycle	Subject Area	Wilks' Lambda	F	sd	Partial Eta-Square
2015	Mathematics	0.936	14732.8*	1.068.712(5)	0.064
	Science	0.935	14767.5*	1.068.712(5)	0.065
2019	Mathematics	0.949	11.008.9*	1.020.321(5)	0.051
	Science	0.951	10.532.9*	1.020.321(5)	0.049

*$p<.05$

Figure 3 and Table 3 show that students who attended preschool in both TIMSS cycles scored significantly higher in both math and science than students who did not attend preschool. In 2015, the difference between these groups' mean scores was 52.3 points in mathematics and 47.1 points in science. The effect sizes showed that the relationship between preschool attendance and academic achievement in 2015 is moderate (0.064 for mathematics; 0.065 for science), and it is at a low level in 2019 (0.051 for mathematics; 0.049 for science).

As the findings for the first research question indicated, preschool education attendance varies significantly by SES. Therefore, the relationship between preschool attendance and academic achievement was examined again by controlling the effect of socioeconomic level. The findings of this analysis are provided in Figure 4 and Table 4.

Figure 4

Change in Mean TIMSS Achievement Scores According to Preschool Education Attendance and SES

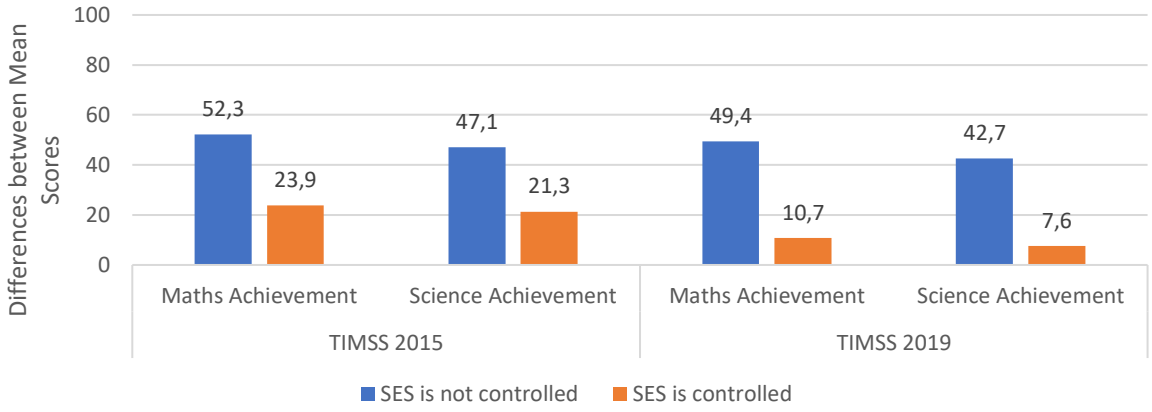


Table 4

Relationship between Preschool Attendance and Differences in TIMSS Achievement—MANCOVA Results

TIMSS Cycle	Subject Area	Wilks' Lambda	F	sd	Partial Eta-Square
2015	Mathematics	0.983	3647.2*	1.052.536(5)	0.017
	Science	0.980	4265.7*	1052 .536(5)	0.020
2019	Mathematics	0.997	689.9*	1.009.211(5)	0.003
	Science	0.996	820.1*	1.009.211(5)	0.004

*$p<.05$

As seen in Figure 4, the difference between the mean academic achievement of those 4th and 5th graders who attended preschool and those who did not decreased significantly when the effect of SES was controlled. In terms of mean scores, the difference was approximately half in the TIMSS 2015 cycle (from 52.3 to 23.9 in mathematics and 47.1 to 21.3 in science); in the TIMSS 2019 cycle, it dropped to about a quarter (from 49.4 to 10.7 in mathematics and 42.7 to 7.6 in science).

Additionally, the change in effect sizes when SES is controlled is critical for the relationship between preschool attendance and academic achievement. While the relationship between attendance in preschool education and academic achievement was moderate in the TIMSS 2015 cycle, it decreased significantly after controlling for students' SES. In the TIMSS 2019, however, the effect of SES becomes more prominent; the relationship between preschool attendance and academic achievement decreases to quite a low level when SES is controlled. Thus, even when the effect of SES is controlled, preschool education attendance has a significant and positive relationship with academic achievement.

Figure 5 and Table 5 depict the findings from the last three PISA cycles regarding the relationship between the SES and mean achievement scores of students who attended and did not attend preschool.

Figure 5

Mean Scores and MANCOVA Results for PISA Cycles by Preschool Education Attendance

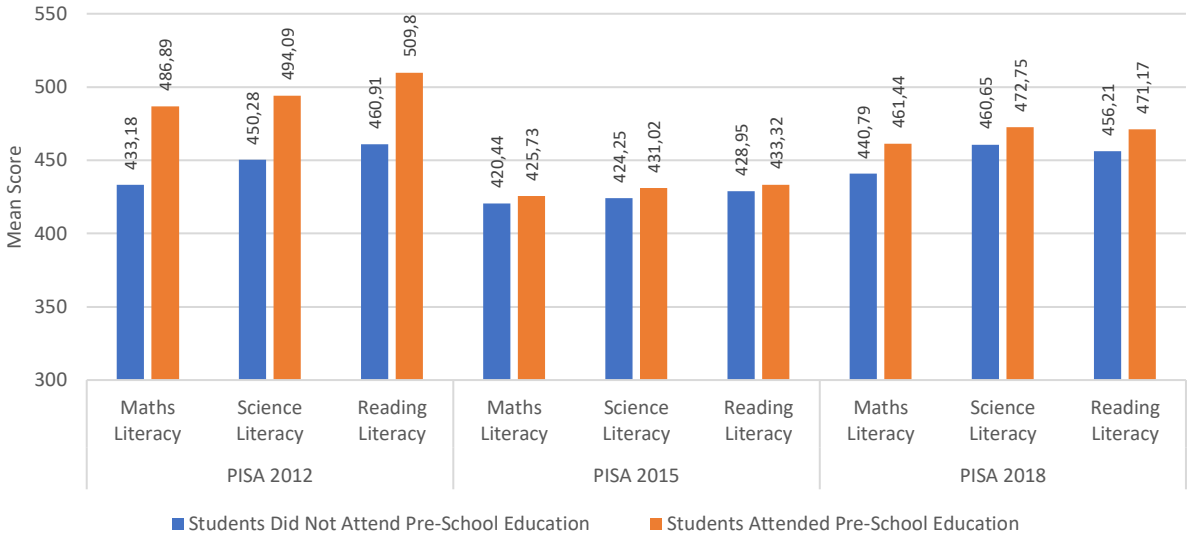


Table 5

Relationship between Preschool Education Attendance and PISA Literacy—MANCOVA Results

PISA Cycle	Subject Area	Wilks' Lambda	F	sd	Partial Eta-Square
2012	Mathematics	0.928	13.272.6*	861.747(5)	0.072
	Science	0.931	12.722.8*	861.747(5)	0.069
	Reading	0.925	13876.8*	861 747(5)	0,075
2015	Mathematics	0.996	354.8*	890 612(10)	0.004
	Science	0.994	539.7*	890 612(10)	0.006
	Reading	0.988	1091.9*	890 612(10)	0.012
2018	Mathematics	0.985	1.288.3*	867.153(10)	0.015
	Science	0.988	1.029.6*	867.153(10)	0.012
	Reading	0.993	653.5*	867.153(10)	0.007

*p<.05

Figure 5 and Table 5 indicate that the relationship between preschool education attendance and students' performance in the PISA shows significant changes across cycles. While the relationship between preschool attendance and mean literacy scores was at a moderate level in all three areas in the PISA 2012, this relationship decreased in the 2015 and 2018 cycles. When the effect of SES is controlled, the medium level relationship obtained in the 2012 cycle decreases to a low level, while in other cycles, there is no significant relationship between academic achievement and access to preschool.

Therefore, while there are significant relationships between preschool education attendance and students' literacy skills, controlling for SES decreases the strength of this relationship. When the effect size coefficients are compared, preschool attendance has a stronger relationship with academic

achievement for students in the 10–11 age group but a weaker relationship with the literacy skills of 15-year-old students.

Discussion and Conclusion

The contributions of preschool to student outcomes have led many countries to expand this level of education (Earle et al., 2018; OECD, 2020). The dissemination of preschool education has become a global education goal to maximize students' high learning capacity during this period (OECD, 2020). However, in countries where preschool education is not compulsory and is still expanding, children from socioeconomically advantaged families attend education at this level more frequently than their peers with lower SES (Bassok et al., 2016; Correia-Zanini et al., 2018).

The Turkish government took concrete steps in the 2000s to expand preschool education and increase students' access to this education level (MoNE, 2021, 2022). As a result of these steps, the schooling rates of 5-year-olds, which were below 30% in the early 2000s, reached 72% by 2019 (MoNE, 2021). On the other hand, very few studies have been conducted in Turkey on the relationship between preschool education attendance and student outcomes. Therefore, the present study aimed to examine the change in students' preschool attendance according to SES and to review the relationship between preschool attendance and academic achievement. Data from the TIMSS and PISA assessments enabled us to generate findings on the relationship between preschool education and academic achievement at different age levels.

The first research question revealed that students from different socioeconomic levels face significant differences when accessing preschool education in Turkey. In particular, the differences between the preschool attendance rates of students at the highest and lowest SES levels are statistically significant. As SES increases, the significant and continuous increase in access to preschool education reveals a clear relationship between these two variables. Secondary findings on access to preschool education show that as SES rises, the duration of preschool education also increases significantly. The TIMSS and PISA findings reveal that the duration of preschool education among students at the highest SES level is significantly higher than those at the lower SES levels. Thus, SES is directly related to not only preschool attendance but also to the time spent at this education level. In other words, as SES increases, both the frequency of students' attendance and duration of education increase.

The findings from the TIMSS and PISA cycles also indicate that preschool attendance has increased remarkably in Turkey since 2000, and the schooling rates from all SES levels have increased significantly. This shows a noteworthy improvement in ensuring that all families have access to preschool and equal opportunities in education. Therefore, this expanding access and opportunity led to a great increase in schooling at this level, and the difference in access rates between groups decreased over time. However, although the differences between socioeconomic groups have decreased over time, preschool attendance remains linked with SES. The results emphasize the importance of policies supporting the preschool education attendance of students with socioeconomic disadvantages.

The second research question examined the relationship between preschool education attendance and academic achievement at different age levels. The findings from both the PISA and TIMSS showed that the mean scores of students who attended preschool education were significantly higher than those of their peers who did not attend preschool. However, the effect sizes indicated a stronger relationship between preschool education and academic achievement for students in the 10–11 age group. Although the relationship between the literacy skills of 15-year-old students and participation in preschool education was also significant, this relationship was relatively weak. These findings show that preschool education may have a stronger relationship with short-term achievement in Turkey.

The differences in students' access to preschool education according to SES necessitated an examination of the role that SES plays in the relationship between academic achievement and preschool attendance. Previous studies have shown that the relationship between academic achievement and preschool attendance decreases when the effect of socioeconomic level is controlled (Correia-Zanini et al., 2018). The main reason for this situation is that while students from high SES backgrounds attend preschool

more frequently, they also benefit more from other important factors such as home resources and family support. The present study found a significant and positive relationship between preschool attendance and academic achievement, even when controlling for socioeconomic level. These findings indicate that the contribution of preschool education to academic achievement can be partially attributed to SES. Therefore, the effect of socioeconomic level, which is closely related to preschool attendance, should also be considered when examining the relationship between preschool education and student outcomes.

An important result of this study is that although significant improvements have been made in this area, access to preschool in Turkey remains associated with SES. While expanding preschool education in Turkey is very important for mitigating the achievement gap between schools (Bölükbaş & Gür, 2020; Özer, 2021a, 2021b; Özer et al., 2021a, 2021b; Suna et al., 2020, 2021), providing equal opportunities to all should be a priority to realize this goal. Thus, the dissemination of preschool education can help mitigate the individual differences in the preschool period and prepare all students ready for learning.

Consequently, increasing access to preschool education will not only increase the equality of opportunity in education, but will also increase the quality of human capital nationwide. Therefore, increasing the preschool education rates in Turkey constitutes an important policy goal that will lead to both short- and long-term gains. In this context, it is important to note that the MoNE initiated a new policy around preschool education during the last quarter of 2021. By the end of 2022, the MoNE aims to increase the schooling rate of 3-year-olds from 14% to 50%, 4-year-olds from 35% to 70%, and 5-year-olds from 78% to 100%. Consequently, the MoNE aims to open 3,000 new kindergartens and 40,000 new nursery classes, having already established 5,424 new kindergartens by the end of 2021, increasing the schooling rate for 5-year-olds from 78% to 85%. It is also important to note that socioeconomically disadvantaged students benefit equally from these institutions, since these schools are free and widespread throughout Turkey. This project holds the potential to increase preschool education attendance and prioritize disadvantaged students, and these steps will be beneficial for increasing Turkey's education quality and international competitiveness.

Declarations

Conflict of Interest: No potential conflict of interest was reported by the authors.

Ethical Approval: Secondary data were used in this study. Therefore, ethical approval is not required.

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