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Investigation of preschool teachers' beliefs related to developmentally appropriate practice and self-regulation skills of children in their classrooms

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Abstract

The objective of this study was to investigate the beliefs held by preschool teachers about Developmentally Appropriate Practice (DAP) and the self-regulation skills of children in their classrooms. In this quantitative study, sample comprised 276 preschool teachers and 276 preschoolers. It was found that preschool teachers exhibited elevated levels of beliefs pertaining to DAP. These beliefs displayed substantial variations based on gender across all sub-dimensions as well as the overall scale. Significant variations in some sub-dimensions can be seen based on factors, such as age, age group of children under their care, professional experience, and the type of educational institution that they are affiliated with. There was a significant difference in the self-regulation skills of preschool children based on the educational level of their mothers and fathers. Furthermore, a noteworthy and statistically significant correlation was seen between preschool teachers' beliefs related to DAP and the level of self-regulation skills of preschoolers.

Keywords: Preschool education, Developmentally appropriate practice, Teachers' beliefs, Self-regulation skills

Introduction

Understanding when, how, where, and how much to use learning strategies is a vital component of the learning process (Çiltaş, 2011). At this point, the entirety of the strategies, approaches, and methodologies employed by individuals to facilitate the educational preparations required for their cognitive growth and personal advancement may be classified as self-regulation. (Şamlı, 2019). Bandura (1989) conceptualized self-regulation as the capacity of children to assume responsibility for their own learning, to generate motivation, to exercise autonomy, and to take control over their cognitive processes. Self-regulation refers to a complex and internally driven mechanism (Özdemir & Budak, 2019). Self-regulation refers to the cognitive and emotional capacity of individuals to effectively control and direct their thoughts, emotions, and responses to external stimuli, focus, and overall disposition in accordance with their own desires. Self-regulation is

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also defined as people's individual–environmental awareness and their capacity to determine the path they will take to attain their objectives (Fındık Tanrıbuyurdu, 2012).

According to Aygün (2020), self-regulation refers to individuals' capacity to exercise control over their wants, actions, and emotions to meet the demands of the social environment, maintain concentration on relevant stimuli, and direct their attention effectively. The development of executive functions influences the development of self-regulation skills in youth (İleri, 2019). At the same time, attention is one constituent of the executive function. When inhibitory control and working memory, which are other sub-dimensions of executive functions, combine with attention skills, cognitive processes occur (Yılmaz, 2020).

Şepitçi Sarıbaş and Gültekin Akduman (2019) emphasized that self-regulation includes the skills needed for good social interactions and learning skills. Moreover, self-regulation is the management of thoughts, emotions, internal stimuli, and reactions (Soyoğlu, 2019). Self-regulation refers to the capacity of children to effectively manage and adapt to the obstacles they encounter (Loomis, 2021). The development of self-regulation abilities is widely recognized as a crucial determinant of children's preparedness for educational settings and their ability to acquire early childhood academic competencies. Simultaneously, self-regulation abilities encompass the capacity of individuals to effectively govern their voluntary endeavors and actions in accordance with the prevailing environment or situation (Kayalı, 2019). Based on the definitions outlined in the existing scholarly literature pertaining to self-regulation, it can be understood that self-regulation refers to individuals' capacity to effectively manage their emotional, cognitive, and behavioral aspects of life, enabling them to engage in intentional and goal-directed actions. One may argue that it represents a form of regulatory apparatus characterized by consciousness. The development of self-regulation skills is influenced by both environmental and individual variables. Preschool teachers are in the children's immediate environment and have a direct influence on their growth.

The acquisition of self-regulation skills throughout the preschool era is of significant importance in shaping a child's future trajectory (Aydın et al., 2025; Sak et al., 2015). Hence, the strategies implemented by preschool teachers hold significant relevance in facilitating the development of self-regulation abilities among preschoolers. Preschool teachers' practices are heavily influenced by their beliefs. Teacher beliefs regarding developmentally appropriate practices, which serve as a framework for child-centered early childhood education programs, can be viewed as an indicator of the quality of the educational environment.

The Developmentally Appropriate Practices (DAP) approach investigates what an effective educational process for children entails as well as how children learn and grow. While meeting the needs of teachers and children, DAP promotes learning and provides objectives that are both challenging and attainable (Kostelnik et al., 2018). Developmentally Appropriate Practices are not a curriculum but rather a framework for developmental principles. These principles contribute to children's future ability to communicate effectively, solve problems, analyze, make logical decisions, respect their environment, and gain access to new information (Copple & Bredekamp, 2009).

Developmentally Appropriate Practices require three distinct categories of information. The first is the development of children based on their age groups and how they

learn. A teacher with this knowledge will be able to make the necessary accommodations to meet the requirements of the children. The second type of knowledge is children's unique characteristics. Having access to this knowledge regarding children will empower teachers to familiarize themselves with their students, consider their unique characteristics, and provide appropriate educational provisions. The third category of information is social and cultural contexts of children. It is emphasized that these contexts that enable the development of children should be known by the teacher (NAEYC, 2009).

The use of the Developmentally Appropriate Practices (DAP) method facilitates effective communication between adults and children (Kostelnik et al., 2018). Establishing a consistent and safe relationship between the teacher and the child is crucial to enhancing communication in early childhood education settings. Teachers are thus one of the most influential factors effecting the quality of education and child development (MONE, 2013). Beliefs are formed in many areas of life through people's beliefs and actions, as well as through the process of education (Berge, 2005). Teacher beliefs have a pivotal role in shaping teaching practices, making them the primary factor in this regard (Şahin Sak & Sak, 2017). Given that teacher beliefs are implicit, the decisions, perceptions, and judgments of instructors reflect their beliefs (Vartuli, 2005).

It is anticipated that beliefs held by preschool teachers on developmentally appropriate practices would have influence on the self-regulation skills exhibited by children within their instructional settings. Due to this rationale, educators' perspectives about this matter advocate for the integration of the preschool education curriculum in conjunction with developmentally appropriate practices. The educational setting and instructional practices established by teachers in alignment with children's growth significantly contribute to their overall development. The positive development of children serves as the foundation for their healthy personalities and ensures social harmony and its continuation.

The principles of Developmentally Appropriate Practices (DAP) are widely recognized as a foundational framework for the implementation of child-centered curricula in many nations. These principles are considered to be a reliable indication of high-quality preschool education. For the preschool education program to effectively cultivate self-regulation skills in children, it is imperative that preschool teachers have high convictions about Developmentally Appropriate Practices. Determining the beliefs of preschool teachers regarding Developmentally Appropriate Practices, revealing teachers' beliefs about contemporary education principles, and contributing to the provision of a more qualified preschool education service are the primary objectives of this study. Due to the low number of children in households today, it is also noteworthy that the number of children whose every request is granted and who lack self-regulation skills has increased (Bayındır, 2016). Considering the significance of self-regulation skills for child development and education, it is crucial that children acquire these skills in early childhood education settings. The beliefs of preschool teachers regarding Developmentally Appropriate Practices, the most modern approach to child development and education, can play a crucial role in the instruction of these skills. Hence, the purpose of this study is to determine the link between these two factors by measuring preschool teachers' beliefs about Developmentally Appropriate Practices and the self-regulation skills of

the children in their classrooms. The primary concern of this study revolves around the following issue: is there a statistically significant correlation between preschool teachers' beliefs regarding developmentally appropriate practices and the level of self-regulation skills exhibited by children in their classrooms? In the context of the primary research topic, the investigation aimed to address the subsequent sub-problems.

What beliefs do preschool educators hold regarding Developmentally Appropriate Practices?

Is there a substantial variation in preschool teachers' beliefs regarding Developmentally Appropriate Practices based on factors, such as age, gender, professional experience, working style, age group taught, school of employment, and class size?

What are the self-regulation skills exhibited by preschool children?

Is there a substantial variation in the self-regulation skills of preschool children based on factors, such as age, gender, duration of attendance at preschool, number of siblings, mother tongue, educational attainment of parents, and the ages of parents?

Is there a statistically significant correlation between preschool teachers' beliefs regarding Developmentally Appropriate Practices and the level of self-regulation skills exhibited by children in their classrooms?

Methods

This study employed survey design as a quantitative research tool. Survey design is a research methodology that involves the systematic collection and analysis of data from a substantial sample size to investigate the attributes or perspectives of individuals. The purpose of this pattern is generally to provide a description by capturing photographs of the extant situation related to the research topic (Büyüköztürk et al., 2020).

Context

In Türkiye, the objective of preschool education is to promote the physical, cognitive, and emotional development of children, facilitate the establishment of positive habits, prepare children for primary education, ensure equity among all children, and support the proper use of the Turkish language (MONE, 2024). In public schools, one teacher typically occupies the classroom, and students primarily engage with their own teacher. A significant number of preschool educators has a 4-year degree in early childhood education or related fields within university child development and education departments. The 4-year program encompasses theoretical and practical studies pertaining to child development, curricular instruction, and various pedagogical abilities. Teachers are appointed to public schools after graduation, based on the outcomes of the national public personnel selection exam (Kamu Personeli Seçme Sınavı-KPSS). Private schools establish their own standards for the selection and hiring of educators. Preschool education includes children aged 36–68 months.

Participants

The study's sample included 276 preschool teachers who were selected using a random sampling procedure. In addition, a child was randomly picked from each teacher's class, resulting in a total of 276 children. Table 1 presents the demographic information pertaining to the participants.

Table 1 Demographic characteristics of teachers and children

	Groups	Frequency (*n*)	Percentage (%)
Age	30 ≤	196	71.0
	31–35	50	18.1
	36 ≥	30	10.9
Gender	Female	241	87.3
	Male	35	12.7
Professional experience	1–5 years	213	77.2
	6 ≥ years	63	22.8
Working status	Permanent employee	221	80.1
	Wage earner	55	19.9
Age group providing education	4 age group	45	16.3
	5 age group	184	66.7
	6 age group	47	17.0
School type	Independent kindergarten	71	25.7
	Nursery class	205	74.3
Class size	5–10	90	32.6
	11–15	92	33.3
	16–20	62	22.5
	21 ≥	32	11.6
Child's gender	Boy	132	47.8
	Girl	144	52.2
Duration of child's attendance at preschool	1 Semester ≤	55	19.9
	2 Semester	114	41.3
	4 Semester	58	21.0
	6 Semester	49	17.8
Number of siblings	1–2	118	42.8
	3–4	110	39.9
	5 ≥	48	17.4
The child's mother tongue	Turkish	140	50.7
	Kurdish	136	49.3
Education level of the child's mother	Primary school	156	56.5
	Middle school	34	12.3
	High school	34	12.3
	Bachelor ≥	52	18.8
Education level of the child's father	Primary school	107	38.8
	Middle school	52	18.8
	High school	57	20.7
	Bachelor ≥	60	21.7
Age of child's mother	26–30	145	52.5
	31–35	86	31.2
	36 ≥	45	16.3
Age of the child's father	26–30	71	25.7
	31–35	122	44.2
	36 ≥	83	30.1

Data collection process

Following the successful acquisition of ethics committee clearance for the study, the researchers proceeded to seek the requisite permits from the Ağrı Provincial Directorate of National Education. These licenses were essential to administer the scales inside independent kindergartens and nursery classes located in both Ağrı province and its districts. The study's objective was elucidated through interviews conducted with teachers who were selected randomly. The Developmentally Appropriate Practice Teacher Beliefs Scale was administered to 276 preschool teachers based on their volunteerism. The teachers were then asked to complete the Self-Regulation Skills Scale for 4–6-year-old children (teacher form) for the self-regulation skills of one child randomly selected from their class.

Data collection tools

Demographic Information Form. In this study, the researchers utilized two distinct forms to gather personal information pertaining to teachers and children under their instruction. The teacher form includes inquiries pertaining to the age, gender, professional experience, employment status (permanent employee or wage earner), age groups of the children they teach, class sizes, and school type (independent kindergarten or nursery class). The form prepared for children consists of questions regarding information, such as the children's gender, mother tongue, number of siblings, duration of preschool attendance, parents' age and parents' education level.

Developmentally Appropriate Practice Teacher Beliefs Scale. The believe subscale of the teacher belief and practice scale, originally created by Kim and Buchanan (2009) to assess Developmentally Appropriate Practices, was subsequently modified into Turkish by Şahin-Sak and Sak (2017). The Turkish version of the Developmentally Appropriate Practices Teacher Belief Scale comprises three sub-dimensions and a total of 29 items, with one question being open-ended. The total reliability coefficient (Cronbach alpha) calculated for all items of the scale is .85. At the same time, the three-factor structure of the scale was confirmed by confirmatory factor analysis. The scale is five-point Likert type (1 = not important at all, 5 = extremely important). The Developmentally Appropriate Practices subscale consists of 13 items in total. An example item for this sub-dimension is as follows: "Observations made by teachers for the planning and evaluation of the preschool education program". The Developmentally Inappropriate Practices subscale consists of 9 items in total. An example item for this sub-dimension is as follows: "To apply the same approach to all children in the classroom for literacy activities… (For example, applying the same reading program for all children)". Family, Culture and Inclusion sub-dimension consists of 6 items in total. The following is an example item for this sub-dimension: "Involving family members in the classroom in ways they feel comfortable with." The highest score that can be obtained from the Developmentally Appropriate Practice Teacher Beliefs Scale is 140 and the lowest score is 28. A high score from the scale indicates that the teacher has a high belief in developmentally appropriate practices. In this study, the reliability coefficient (Cronbach alpha) of the Developmentally Appropriate Practice Teacher Beliefs Scale was found to be high as .848.

Self-Regulation Skills Scale for 4–6-year-old children (teacher form). It was developed by Erol and İvrendi (2018). Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) were applied. As a result of EFA, a three-factor structure with 22 items was obtained, which explained 63% of the total variance. The factors obtained were named as attention, working memory and inhibitory control. An example item regarding the attention subscale is as follows: "When she starts a task or activity, she/he has the concentration to finish it". The sample item regarding the working memory sub-dimension is as follows: "Follows the rules without needing to remind her/his". Example of an item pertaining to the inhibitory control sub-dimension: "She/He expresses her feelings and thoughts easily". While the internal consistency coefficient of the measurement tool was determined as .94, the reliability coefficient (Cronbach alpha) of the scale in this study was found to be high as .951.

Data analysis

The descriptive features of the research participants were determined using frequency and percentage values, while the scales were examined using mean and standard deviation. When the Kurtosis and Skewness values and Kolmogorow–Smirnov test result were evaluated together to determine whether the research variables showed a normal distribution, it was determined that the data showed a normal distribution. Parametric tests were used to analyze the data. The relationship between preschool teachers' beliefs about Developmentally Appropriate Practice and the self-regulation skills of children in their classes was examined through Pearson correlation analysis. Correlation coefficients (r) are low in the range of 0.00–0.30; values between 0.30 and 0.70 are considered medium level; values between 0.70 and 1.0 are indicated a high relationship (Büyüköztürk, 2011). The t test for independent samples was used to compare continuous data between two independent groups, and the one-way ANOVA test was used to compare continuous data between more than two independent groups. Following the use of the ANOVA test, the Bonferroni test, which is one of the post-hoc tests, was employed to ascertain the origins of the observed differences. The effect size for significant results was calculated and these effect sizes were interpreted based on Cohen's (1988) guidelines: i.e., .20 was considered a small effect, .50 a medium effect and .80 a large effect.

Results

Preschool teachers' beliefs about developmentally appropriate practice. Table 2 presents the statistical measures, including the mean, standard deviation, and minimum–maximum values, according to the opinions of preschool teachers regarding developmentally appropriate practice.

Table 2 Teachers' beliefs about developmentally appropriate practice

	N	$\bar{x}$	Sd	Min	Maks
Total beliefs regarding developmentally appropriate practices	276	114.417	11.692	75.000	138.000
Developmentally appropriate practices subscale	276	55.504	6.721	28.000	65.000
Developmentally inappropriate practices subscale	276	19.500	5.937	9.000	40.000
Family, culture and inclusion subscale	276	24.413	3.860	15.000	30.000

Table 3 Results of one-way analysis of variance, developmentally appropriate practice (DAP), by age

	Groups	*N*	$\bar{x}$	Sd	*F*	*p*	Significant difference
Total beliefs regarding DAP	30 ≤	196	115.056	11.888	1.086	0.339	
	31–35	50	113.240	10.742			
	36 ≥	30	112.200	11.865			
Developmentally appropriate practices subscale	30 ≤	196	55.989	6.454	2.109	0.123	
	31–35	50	54.780	7.273			
	36 ≥	30	53.533	7.228			
Developmentally inappropriate practices subscale	30 ≤	196	19.755	6.382	0.875	0.418	
	31–35	50	19.240	4.804			
	36 ≥	30	18.266	4.378			
Family, culture and inclusion subscale	30 ≤	196	24.821	3.635	4.253	0.015	1 > 3
	31–35	50	23.700	4.175			
	36 ≥	30	22.933	4.322			

Upon examination of Table 2, it can be observed that preschool teachers' beliefs about developmentally appropriate practices are high.

Upon examination of Table 3, it is evident that there is no significant difference observed in the overall scale and the sub-dimensions of Developmentally Appropriate Practices and Developmentally Inappropriate Practices among preschool teachers' beliefs about developmentally appropriate practice, based on their ages ($p > 0.05$). Preschool teachers' beliefs in the Family, Culture and Inclusion sub-dimension of the scale showed a statistically significant difference according to their age ($F_{(3,\ 273)} = 4{,}253$; $p = 0{,}015 < 0.05$). The Bonferroni test was conducted to identify the sources of differences, it was found that the mean belief of teachers in the 30 ≤ age group regarding the Family Culture and Integration sub-dimension ($\bar{x} = 24.821$) was higher than the mean of teachers in the 36 ≥ age group ($\bar{x} = 22.933$).

Upon analyzing Table 4, it was observed that the mean scores of female preschool teachers in relation to their beliefs on developmentally appropriate practices were higher compared to the mean scores of male preschool teachers. This trend was observed across the total scale, as well as the sub-dimensions of Developmentally Appropriate Practices and Family Culture and Inclusion. The results of the study indicate that male preschool teachers had a higher mean score in the Developmentally Inappropriate Practices sub-dimension compared to their female counterparts.

The findings indicate that there is no significant difference in the beliefs of preschool teachers about the sub-dimension of Developmentally Inappropriate Practices based on their professional experiences ($p > 0.05$). There was a statistically significant difference seen among preschool teachers' beliefs on Developmentally Appropriate Practices. This difference was apparent in the whole scale, as well as in the sub-dimensions of Developmentally Appropriate Practices and Family Culture and Integration. The mean of preschool teachers with 1–5 years of professional experience was found to be greater than that of preschool teachers with 6 or more years of professional experience.

It was determined that preschool educators' beliefs regarding the Developmentally Inappropriate Practices sub-dimension differed significantly depending on the educational institution in which they were employed ($F_{(2,\ 274)} = 2{,}326$; $p = 0{,}021 < 0.05$). It

Table 4 Independent-samples *t* test results, developmentally appropriate practice (DAP), by gender, professional experience and School type

	Groups	*N*	x̄	Sd	*t*	*p*	Cohen's *d*
Total beliefs regarding DAP	Female	241	115.448	11.321	3.946	0.000	0.700
	Male	35	107.314	11.894			
Developmentally appropriate practices subscale	Female	241	55.855	6.700	2.295	0.022	0.421
	Male	35	53.086	6.446			
Developmentally inappropriate practices subscale	Female	241	19.042	5.554	− 3.432	0.009	0.549
	Male	35	22.657	7.456			
Family, culture and inclusion subscale	Female	241	24.635	3.814	2.530	0.012	0.454
	Male	35	22.886	3.879			
Total beliefs regarding DAP	1–5 years	213	115.427	11.125	2.670	0.008	0.366
	6≥ years	63	111.000	12.953			
Developmentally appropriate practices subscale	1–5 years	213	55.981	6.318	2.186	0.030	0.295
	6≥ years	63	53.889	7.773			
Developmentally inappropriate practices subscale	1–5 years	213	19.333	5.907	− 0.857	0.392	–
	6≥ years	63	20.064	6.051			
Family, culture and inclusion subscale	1–5 years	213	24.779	3.637	2.939	0.009	0.400
	6≥ years	63	23.175	4.339			
Total beliefs regarding DAP	Independent kindergarten	71	116.478	10.888	1.731	0.085	–
	Nursery class	205	113.702	11.899			
Developmentally appropriate practices subscale	Independent kindergarten	71	55.873	6.449	0.537	0.592	–
	Nursery class	205	55.375	6.822			
Developmentally inappropriate practices subscale	Independent kindergarten	71	18.098	4.739	− 2.326	.021	0.340
	Nursery class	205	19.985	6.235			
Family, culture and inclusion subscale	Independent kindergarten	71	24.704	3.716	0.737	0.462	–
	Nursery class	205	24.312	3.912			

was found that the means of teachers working in nursery classes ($\bar{x}=19.985$) were higher than the means of teachers working in independent kindergartens ($\bar{x}=18.098$) in this sub-dimension.

Furthermore, it was found that there was no statistically significant variation in the total score and sub-dimensions of the scale measuring preschool teachers' beliefs regarding developmentally appropriate practices based on their employment status (permanent employee or wage earner) and the number of children in their classes.

Upon examination of Table 5, it is evident that there are noticeable variations in preschool teachers' beliefs of developmentally appropriate practices based on the age group they instruct. These differences are statistically significant in both the overall scale ($F_{(2,273)}=4{,}609$; $p=0{,}011<0.05$) and in the developmentally appropriate practices sub-dimension ($F_{(2,273)}=5{,}055$; $p=0{,}007<0.05$). It was found that the means of teachers teaching 5 years were higher than the means of teachers teaching 4 years.

Table 5 Results of one-way analysis of variance, developmentally appropriate practice (DAP), by age

	Groups	*N*	$\bar{x}$	Sd	*F*	*p*	Significant difference
Total beliefs regarding DAP	4 age group	45	110.622	12.727	4.609	0.011	2 > 1
	5 age group	184	115.864	10.820			
	6 age group	47	112.383	13.034			
Developmentally appropriate practices subscale	4 age group	45	53.089	7.061	5.055	0.007	2 > 1
	5 age group	184	56.353	6.576			
	6 age group	47	54.489	6.375			
Developmentally inappropriate practices subscale	4 age group	45	19.822	6.750	0.384	0.681	
	5 age group	184	19.283	5.650			
	6 age group	47	20.043	6.290			
Family, culture and inclusion subscale	4 age group	45	23.356	3.432	2.984	0.057	
	5 age group	184	24.794	3.749			
	6 age group	47	23.936	4.469			

Table 6 Self-regulation skills scores of children in preschool teachers' classes

	N	$\bar{x}$	Sd	Min	Maks
Total of self-regulation skills	276	82,460	13,975	41,000	110,000
Inhibitory control	276	29,388	6057	12,000	40,000
Attention	276	32,478	6542	9000	45,000
Working memory	276	20,594	3164	10,000	25,000

Table 7 Results of one-way analysis of variance, self-regulation skills, by education level of mother

	Groups	*N*	$\bar{x}$	Sd	*F*	*p*	Significant difference
Total of self-regulation skills	Primary school	156	80.013	13.897	4.754	0.026	Significant difference
Total of self-regulation skills	Middle school	34	84.177	17.184	4.754	0.026	4 > 1
Inhibitory control	High school	34	83.471	13.996	4.857	0.003	
	Bachelor ≥	52	88.019	9.791			
	Primary school	156	28.385	6.190			
Inhibitory control	Middle school	34	30.088	6.603	4.857	0.003	4 > 1
Attention	High school	34	29.382	6.267	3.311	0.021	
	Bachelor ≥	52	31.942	4.207			
	Primary school	156	31.455	6.438			
Attention	Middle school	34	33.500	7.902	3.311	0.021	4 > 1
Working memory	High school	34	33.147	7.029	2.996	0.031	
	Bachelor ≥	52	34.442	4.929			
	Primary school	156	20.173	3.111			
Working memory	Middle school	34	20.588	4.076	2.996	0.031	4 > 1
	High school	34	20.941	2.954			
	Bachelor ≥	52	21.635	2.536			

Self-regulation skills of preschool children. Table 6 presents the mean, standard deviation, and minimum–maximum values pertaining to the self-regulation skills of the participant children.

When Table 6 is examined, it can be said that children's self-regulation skills are at the mid-to-high level self-regulation limit.

Upon analyzing Table 7, it becomes evident that there exist notable variations in the self-regulation skills of children attending preschool. These differences are observed specifically in relation to the educational background of the children's mothers. This discrepancy is evident across the entirety of the self-regulation skills scale, as well as in all sub-dimensions. As a result of the Bonferroni test, it was found that the self-regulation skills of children whose mothers had a bachelor degree or higher were higher than those of children whose mothers had a primary school education.

Upon analysis of Table 8, it was observed that there were noticeable variations in the self-regulation skills of children in the preschool instructors' classes. These differences were found to be statistically significant and were based on the educational background of their fathers. Specifically, the variations were observed in the overall scale score as well as in the sub-dimensions of Inhibitory Control and working memory. As a result of the Bonferroni test, it was found that the self-regulation skills of children whose fathers had bachelor degree or above were higher than those of children whose fathers had a primary school education. In addition, in the working memory sub-dimension, it was found that the self-regulation skills of children whose fathers had a high school education were higher than those of children whose fathers had a primary school education.

Furthermore, the findings from the analysis indicate that there were not any statistically significant differences in the self-regulation skills of the children enrolled in the preschool teachers' classes based on factors, such as age, gender, length of attendance at preschool, number of siblings, mother tongue, as well as the ages of the mother and father ($p > 0.05$)

Examining Table 9 reveals significant relationships between the total and sub-dimension scores of preschool teachers' beliefs regarding developmentally appropriate practices and the total scores of children's self-regulation skills in their classes.

Table 8 Results of one-way analysis of variance, self-regulation skills, by education level of father

	Groups	*N*	$\bar{x}$	Sd	*F*	*p*	Fark
Total of self-regulation skills	Primary school	107	79.308	14.418	3.466	0.017	4 > 1
	Middle school	52	83.615	13.801			
	High school	57	83.526	14.613			
	Bachelor ≥	60	86.067	11.663			
Inhibitory control	Primary school	107	28.094	6.273	3.601	0.014	4 > 1
	Middle school	52	29.558	6.313			
	High school	57	29.754	6.119			
	Bachelor ≥	60	31.200	4.877			
Attention	Primary school	107	31.299	6.459	2.146	0.095	
	Middle school	52	33.250	6.420			
	High school	57	32.702	7.263			
	Bachelor ≥	60	33.700	5.849			
Working memory	Primary school	107	19.916	3.445	2.860	0.037	3 > 1 4 > 1
	Middle school	52	20.808	2.971			
	High school	57	21.070	3.029			
	Bachelor ≥	60	21.167	2.750			

Table 9 Pearson correlation analysis results of the relationship between preschool teachers' beliefs about dap and the self-regulation skills of children in their classes

		Total beliefs regarding DAP	Developmentally appropriate practices subscale	Developmentally inappropriate practices subscale	Family, culture and inclusion subscale
Total of self-regulation skills	*r*	418**	.327**	− .242**	.322**
	p	0.000	0.000	0.000	0.000

** < 0.01

There is a positive, moderately significant relationship ($p = 0.000 < 0.05$) between the total of preschool teachers' beliefs about developmentally appropriate practices and the children's self-regulation skills ($r = .418$). There is a positive, medium-level significant relationship ($p = 0.000 < 0.05$) between preschool teachers' beliefs regarding the Developmentally Appropriate Practices sub-dimension and the children's self-regulation skills ($r = .327$). There is a negative, weakly significant relationship ($p = 0.000 < 0.05$) between preschool teachers' beliefs regarding the Developmentally Inappropriate Practices sub-dimension and the children's self-regulation skills ($r = -242$). There is a positive, moderately significant relationship ($r = .322$) between preschool teachers' beliefs regarding the family, culture and inclusion sub-dimension and children's self-regulation skills ($p = 0.000 < 0.05$).

Discussion

It can be said that the preschool teachers who participated in this study have high beliefs about developmentally appropriate practices. This finding overlaps with the findings of other studies. (Demircan, 2012; Faour, 2003; Hegde & Cassidy, 2009; Rentzou & Sakellariou, 2011; Şahin-Sak et al., 2018). According to this result, preschool teachers are aware of the necessity of a child-centered program and the individual characteristics of children (Abu-Jaber et al., 2010). In addition, the Ministry of National Education Preschool Curriculum implemented in preschool education institutions in Türkiye is compatible with the principles of Developmentally Appropriate Practices, is child-centered. It can be said that Turkish preschool teachers have adopted these principles.

There was a statistically significant difference seen in the beliefs of preschool teachers in the sub-dimension of Family, Culture, and Inclusion, based on their age. It was found that the mean of teachers in the 30 and under age group were higher than the mean of teachers in the 36 and above age group. The emergence of this finding is attributed to the belief that young teachers, namely, those who have recently graduated, possess a more favorable perception of developmentally appropriate behaviors in contrast to their more experienced counterparts. In alternative terms, it might be posited that the adoption of developmentally appropriate practices in Turkey is still in its nascent stages.

It was found that female preschool teachers' beliefs about developmentally appropriate practices were higher than male preschool teachers' beliefs. This finding is also supported by the findings of other studies (Soyalp, 2019). The observed outcome is believed to be influenced by cultural elements, as it might be attributed to the tendency of male educators in Turkish culture to adopt a more structured and rule-oriented approach, aligning with the societal expectations placed upon them. For

example, in Turkish society, male educators are typically perceived as more authoritative individuals in the classroom, as moms frequently use the authority of dads to discipline disobedient children (Sak, 2015; Sak et al., 2015). This may lead male teachers to develop more prescriptive and authoritarian attitudes due to their association with the father image, which may negatively impact their beliefs about developmentally appropriate practices.

The beliefs of teachers with 1–5 years of professional experience in the sub-dimensions of Developmentally Appropriate Practices and Family Culture and Inclusion and in the overall scale were found to be higher than the beliefs of teachers with 6 years or more of professional experience. While there exist research that provide support for this particular conclusion (Hegde & Cassidy, 2009), there are also studies that present contrasting evidence. For example, Soyalp (2019) and Abu Jaber et al. (2010) stated that the professional experiences of preschool teachers did not create a significant difference in their beliefs regarding Developmentally Appropriate Practices. It is thought that teachers with 1–5 years of experience are newly graduated teachers and their awareness of developmentally appropriate practices is higher than older graduate teachers. It is thought that the fact that newly graduated teachers receive training in parallel with developmentally appropriate application principles is effective in shaping their beliefs.

In the Developmentally Appropriate Practices sub-dimension and the overall scale, it was found that the mean of teachers teaching 5 years was higher than the mean of teachers teaching 4 years. It is thought that the emergence of this finding is due to the fact that 5-year-old children express themselves, present their individual preferences in activities, and are better at social interactions with teachers and friends than 4-year-old children, as well as the fact that 5-year-old teachers can apply developmentally appropriate practices more easily.

It was found that the mean of teachers working in nursery classes regarding the Developmentally Inappropriate Practices sub-dimension were higher than the mean of teachers working in independent kindergartens. This outcome is believed to be influenced by the disadvantages faced by teachers in nursery classes compared to those in independent kindergartens (Can & Kılıç, 2019). For example, the disadvantages of nursery classes in terms of physical conditions and lack of material may have increased the beliefs of preschool teachers working there regarding Developmentally Inappropriate Practices.

The study revealed that there was not a significant difference in preschool teachers' beliefs regarding developmentally appropriate practices based on the number of children in their classrooms. This finding is opposite to expectation. Because it is expected that preschool teachers' beliefs about developmentally appropriate practices will be low when the number of students in the classroom is too small (5–10) or too many (21 and over). However, the current study's result is thought to be related to the fact that teachers do not perceive the number of children as an advantage or disadvantage in terms of their beliefs on this subject. In addition, it was determined that preschool teachers' beliefs about developmentally appropriate practices did not show a significant difference according to the teachers' working status (Permanent employee-Wage earner). There are studies that support this finding (Soyalp, 2019).

Another important finding of the study; the self-regulation skills of children in preschool teachers' classes are at the mid-to-high-level self-regulation limit. It can be

said that this result is related to the high beliefs of the preschool teachers participating in the research regarding Developmentally Appropriate Practices.

The study revealed that there was no significant difference in the self-regulation skills of children in preschool teachers' classes based on the children's age. There are studies indicating that self-regulation skill levels do not differ significantly depending on the child's age (Atmaca, 2019; Aygün, 2020; Bayındır, 2016; İleri, 2019). There are also studies contradicting these findings (Arslan et al., 2021; Dinçer Yavuz, 2019; Ertürk, 2013; Ertürk Kara, 2015). For this reason, it cannot be said that the age variable has a definite effect on self-regulation skills, and it is thought that as children get older, progress will be made in all developmental areas and their self-regulation skills also increase.

It was found that children's self-regulation skills did not differ significantly according to their gender. There are research supporting this finding (Dinçer Yavuz, 2019; Ertürk, 2013; Ertürk Kara, 2015; Güngör, 2021; Kovancı, 2020; Mercan, 2019; Montroy et al., 2014; İleri, 2019; Işıksolu ve, 2020). However, some studies have found that girls' self-regulation skills are higher than boys (Arslan et al., 2021; Astarlar, 2019; Atmaca, 2019; Bayındır, 2016; Çalış Toktalmış, 2021; Dağgül & Gürşimşek, 2019; Eroğlu, 2018; Kurt, 2020; Mercan, 2020; Montroy et al., 2016; Smith-Donald et al., 2007). It is thought that cultural factors and parental attitudes may also have an impact on children's self-regulation skills depending on gender.

The study revealed that there was not a significant difference in children's self-regulation skills based on the length of their enrollment in preschool education. Several research have shown results that contradict this particular finding (Arslan et al., 2021; Astarlar, 2019; Kurt, 2020). As children's experiences will increase depending on the duration of their attendance at preschool education institution, they are expected to acquire developmental gains such as being able to control their emotions and behaviors, behaving in accordance with the requirements of social life, and increasing attention span. The present study did not find any significant differences in children's self-regulation skills based on the duration of their preschool education, contrary to initial expectations.

It was found that children's self-regulation skills did not show a significant difference according to the number of siblings. There are research supporting this finding (Atmaca, 2019; Aygün, 2020). There are also studies that do not support this finding (Çalış Toktalmış, 2021; Dağgül & Işık Gürşimşek, 2019; Ertürk, 2013; Mercan, 2019). It may be posited that an increase in the number of siblings is associated with a decrease in the amount of quality time parents provide to their children, reduced communication, fewer possibilities for growth, and diminished provision of material and spiritual support. While there is a prevailing belief that the self-regulation skills of children may diminish with an increasing number of siblings, this study did not provide any statistically significant differences in this regard.

Research has indicated that children whose moms possess a bachelor's degree or above exhibit greater levels of self-regulation skills compared to children whose mothers have completed only primary school education. In addition to research findings parallel to this result (Ertürk, 2013; Mercan, 2019), there are also opposite findings (Atmaca, 2019; Aygün 2020; Mercan, 2020; Dağgül & Işık Gürşimşek, 2019; Orhan Taşkoyan, 2020). Since an educated mother will have a more conscious perspective on the child's

development, she is expected to be aware of the children's interests and needs. Thus, it is thought to contribute to the development of children's self-regulation skills.

It was discovered that children's self-regulation skills showed a significant difference in the control, working memory sub-dimensions and the total of the scale depending on the father's education level. It was found that the self-regulation skill levels of children whose fathers had a bachelor degree or above were higher than those of children whose fathers graduated from primary school. There are studies that support this finding (Çalış Toktalmış, 2021; Ertürk, 2013; Ertürk Kara, 2015; Karakurt, 2019; Mercan, 2019; Şepetçi, 2018; Işıksolu Aysel, 2020; İleri, 2019; Orhan Taşkoyan, 2020; Şamlı, 2019; Tekin, 2018; Yıldız, 2020). There are also studies that contradict this finding (Atmaca, 2019; Mercan, 2020; Tuzcuoğlu et al., 2019). The expectation is that an educated father will act more consciously when rearing a child and will create a rich environment that supports his child's development, thereby fostering self-regulation skills in children.

The study revealed that there was no substantial difference in children's self-regulation skills based on the age of their mothers. There are research supporting this finding (Atmaca, 2019; Aygün, 2020; Ertürk, 2013; Fındık-Tanrıbuyurdu, 2012; Işıksolu Aysel, 2020; İleri, 2019; Öztabak, 2017; Yıldız, 2020; Yılmaz, 2020). There are also studies contrary to this finding (Mercan, 2019). In addition, children's self-regulation skills did not differ significantly according to their fathers' ages in current study. There are studies that support this finding (Atmaca, 2019; Aygün, 2020). There is a belief that other factors beyond parental age, such as parental temperament, socio-cultural attributes, educational attainment, and employment situation, could influence the development of self-regulation skills in children.

It was discovered that there are significant relationships between the total and all sub-dimensions scores of preschool teachers' beliefs about developmentally appropriate practices and the total scores of self-regulation skills of children in their classes. Teachers who have high belief in developmentally appropriate practices are expected to create a more child-centered and democratic learning environment in their classrooms. Therefore, in this study, the moderate positive relationship between teachers' beliefs about developmentally appropriate practices and the self-regulation skills of children in their classes is an expected finding.

Suggestions and limitations

Teacher beliefs are critical in shaping teachers' practices. To create a qualified educational environment, supportive in-service training can be provided to teachers regarding developmentally appropriate practices, which today serve as a framework for child-centered early childhood education programs. Since the principles regarding Developmentally Appropriate Practices are accepted as an indicator of qualified preschool education, not only preschool teachers, but also administrators and all personnel working in preschool education institutions can participate in trainings to increase their awareness of these principles. In line with the emphasis of Developmentally Appropriate Practices on school–family cooperation, teachers can increase families' awareness on this issue by organizing family trainings, home visits, seminars and family participation activities to support children's self-regulation skills.

It may be useful to increase teachers' awareness about conducting in-class and out-of-class activities to improve children's self-regulation skills and supporting these activities with materials that will contribute to the development of self-regulation skills. Hence, it is advisable to provide in-service training programs, courses, and seminars focused on enhancing children's self-regulation skills. Teachers should be motivated to actively engage in these training opportunities.

A limitation of this study is that important variables such as income level, occupation and living conditions were not controlled. In further studies, causal relationships studies can be conducted in which these variables are controlled. In this study, only quantitative data collection tools were used and the quantitative method was used. In other studies, mixed method and qualitative method can also be used to examine the subject in more depth. Longitudinal studies can be conducted to monitor the development of children's self-regulation skills from the beginning to the end of the period in which they begin their preschool education. According to the results obtained from this study, since female preschool teachers' mean beliefs about Developmentally Appropriate Practices were found to be higher than male teachers, the effect of the gender variable on beliefs and practices regarding developmentally appropriate practices can be investigated in depth.

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Data availability
The data presented in this manuscript are available when reasonable request.

Declarations

Ethics approval and consent to participate
This work was approved by the Ethics Board of Van Yüzüncü Yıl University before initiation of the study (Number: 2023/02-05).

Informed consent
Informed consent was obtained from all individual participants included in the study.

Competing interests
The authors declare that there is no competing interests.

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