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Self-Regulated Learning among Preschool Children: A Case Study from China

Jie Yao

Universiti Sains Malaysia, School of Educational Studies, USM, 11800 Gelugor, Penang, Malaysia

Email: yaojie@xmphdds.cn

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Abstract

This study examined the self-regulated learning level of 5-6-year-old preschool children in the Chinese context, and analyzed the differences in the self-regulated learning level of preschool children in terms of gender and monthly age. The study adopted a random sampling survey method, and the participants were 5-6-year-old children in private kindergartens in Liaocheng City, Shandong Province. SPSS 27 was used to analyze the collected data. The results showed that the self-regulated learning of 5-6-year-old preschool children was at an upper-middle level, and in each dimension, the motivational strategy level was better than the metacognitive strategy level and better than the cognitive strategy level. The data showed that boys performed better in self-regulated learning than girls, and older children performed better in self-regulated learning than younger children, but there was no significant difference. Finally, this paper also proposed strategies to improve children's self-regulated learning skills.

Keywords: Chinese Preschool Children, Self-Regulated Learning, Strategies, Private Kindergarten

Introduction

Since the 1980s, the concept of self-regulated learning (SRL) has gained widespread use and is commonly defined as the active management of one's cognition, motivation, and behavior during the learning process (Panadero, 2017). Initially introduced by Holec (1981), self-regulated learning is viewed as a crucial skill that allows learners to take control of their own educational activities. Over the past decades, numerous researchers (Jansen et al., 2022; Lim et al., 2023; Kong & Yang, 2024; Tzimas & Demetriadis, 2024) have explored how individuals regulate their learning behaviors. This field has become central for both researchers and educators, who aim to understand how learners actively engage and take responsibility for their learning (Yan et al., 2023; Nguyen et al., 2023). The significance of SRL has drawn increasing attention in educational research and practice (Higgins et al., 2021) and has been approached from various theoretical angles (Vandevelde et al., 2016). As awareness

of the value of self-regulation grows (Edisherashvili et al., 2021), self-regulated learning is becoming ever more critical in today's world (Heirweg et al., 2019).

Self-regulated learning (SRL) skills are regarded as essential for both life-long learning and academic success (Saraç & Tarhan, 2021). SRL is strongly connected to students' deliberate thoughts, emotions, and actions, which play a crucial role in shaping their learning outcomes and motivation (Palloan et al., 2021). Students who practice self-regulated learning possess autonomy, competence, and self-efficacy, enabling them to believe that the goals they pursue are worthwhile (Peck et al., 2018). Children who exhibit self-regulation in learning are actively engaged in the learning process, allowing them to adapt to various environments and control the thoughts related to their learning (Muhammet et al., 2018; Hutchinson et al., 2021). When children have autonomy over their learning, they are more likely to manage their learning strategies effectively and find the learning experience itself more engaging (Chu et al., 2020). Early childhood represents a pivotal stage, characterized by rapid physical and neural growth (Liu et al., 2022). Research emphasizes the importance of early childhood education, making it crucial to nurture self-regulated learning from a young age, as children's learning abilities, once established, are hard to alter. With the growing emphasis on independent knowledge acquisition and adaptability, it is vital that children develop into competent, independent learners who actively regulate their development and learning behaviors (Dörr & Perels, 2019).

Self-regulated learning is an important learning skill for children (Hautakangas et al., 2021). However, despite its importance, there have been limited studies conducted on the self-regulated learning of Asian preschool children, specifically in the Chinese context. Studies (Paans et al., 2019; Davis et al., 2021) carried out on non-Asian children may not be applicable or generalizable to Chinese learning cultures due to significant differences. Chinese learning processes are deeply influenced by Confucian culture, resulting in distinct ways in which children learn and regulate their behavior (Liu et al., 2018). Particularly at the preschool level, teaching and learning processes in China tend to be more teacher-led, which may lead to differences in their learning strategies compared to their Western counterparts (Liu et al., 2018). Consequently, it is essential to explore how Chinese preschool children self-regulate during their learning experiences. This study aims to evaluate the level of self-regulated learning among Chinese preschoolers. The research will address the following questions: i) What is the level of self-regulated learning among Chinese preschool children? ii) Are there significant differences in self-regulated learning based on various demographic factors such as gender and age? iii) What strategies can be implemented to enhance preschool children's self-regulated learning skills?

Research Design

This study examines the self-regulated learning levels of Chinese preschool children and investigates whether significant differences exist based on factors such as gender and age. A quantitative descriptive research design was adopted since this research aims to use the collected quantitative data to describe preschool children's self-regulated learning level.

Sample/Participants

The participants of this study were children aged 5 to 6 years old from private kindergartens in Liaocheng City, Shandong Province. This study adopted a random sampling

method, and the children voluntarily participated in the survey. Table 1 shows the distribution of the sample group.

Table 1
Summary of participant's demographic characteristics

Variables	Characteristics	N	%
Gender	Boy	56	48.7%
	Girl	59	51.3%
Monthly Age	Younger Monthly Age (63~67)	56	48.7%
	Older Monthly Age (68~71)	59	51.3%
Total		115	100%

Instrument

The tool used in this study is the Strategic Behavior Observation Scale for assessing children's self-regulated learning strategies compiled by Dermitzaki in 2005. The original scale has 14 evaluation items. Chinese scholar Tong (2018) selected 9 of them in the study, with 3 items in each dimension, and the overall Cronbach's coefficient is 0.88, which meets the requirements of psychometrics. This study uses the Strategic Behavior Observation Scale for children's self-regulated learning strategies selected by Tong (2018) for observation. The Likert four-point method is used, from "very inconsistent" to "very consistent", divided into three dimensions (cognitive strategies, metacognitive strategies, motivational strategies), and the evaluation content of the three dimensions are: i) Cognitive strategies (three questions): choosing between main and trivial, analyzing and combining activities, use demonstration diagrams; ii) Metacognitive strategies (three questions): monitoring of the activities, awareness of errors and adjusting intermediate aims, learning from one's own errors; iii) Motivational strategies (three questions): maintaining motivation, working autonomously, and persistence on the task.

Data collection and analysis

All children were randomly selected and volunteered to participate in this study. Participants completed a puzzle in the construction area on their own. Observers scored the children's puzzle completion process based on the evaluation content. The whole process took about 10 minutes, and children had the right to stop the activity at any time. A total of 128 children were observed in this study, of which 115 were valid scales. The study used the percentage, mean, standard deviation, and independent sample t-test functions in SPSS 27 to answer the research questions. After data conversion, the study obtained the mean range of children's self-regulated learning level. The mean scope is presented in Table 2.

Table 2
Mean range for self-regulated learning level

Mean range	Interpretation
1-2	Low level of self-regulated learning
2-3	Moderate level of self-regulated learning
3-4	High level of self-regulated learning

Results

This study used the observation method to effectively observe the self-regulated learning strategies levels of 115 children aged 5 to 6 years old, including 56 boys and 59 girls, 56 children of younger age (63 months to 67 months), and 59 children of older age (68 months to 71 months). Self-regulated learning strategies include three dimensions: cognitive strategies, metacognitive strategies, and motivational strategies. The following presents the levels of self-regulated learning strategies of 5-6 year old children from these three dimensions and the overall self-regulated learning strategy.

Cognitive Strategy

Descriptive Statistical Analysis

As seen in Table 3, in the strategy of choosing between main and trivial, the average score of children was 2.16, in the strategy of analyzing and combining activities, the average score of children was 2.17, in the strategy of use demonstration diagrams, the average score of children was 2.59, and in the dimension of cognitive strategy, the overall average score was 2.30.

Table 3
Descriptive statistical analysis of cognitive strategies

	N	Minimum	Maximum	Mean	Std.Deviation
Choosing between main and trivial	115	2.00	3.00	2.16	.365
Analyzing and combining activities	115	2.00	3.00	2.17	.373
Use demonstration diagrams	115	2.00	3.00	2.59	.494
Cognitive strategies	115	2.00	3.00	2.3043	.25579

Gender Difference Analysis

As showed in Table 4, the independent sample T test was used to test the gender differences in cognitive strategies in self-regulated learning strategies, boys' cognitive strategies are higher than girls', with an average difference of .02169, but it did not reach a significant level (P=.651). Therefore, there is no gender difference in cognitive strategies.

Table 4
An analysis of gender differences in cognitive strategies

	Levene's Test for Equality of Variances		T-test for Equality of Means						
	F	Sig.	t	df	Sig.(2-tailed)	Mean Difference	Std.Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	3.503	.064	.453	113	.651	.02169	.04789	-.07319	.11657
Equal variance			.450	103.949	.654	.02169	.04820	-.07389	.11727

s not assumed									

Analysis of Monthly age Differences

The results of monthly age differences of cognitive strategies are presented in Table 5. The independent sample T test was used to test the monthly age differences in cognitive strategies in self-regulated learning strategies. The cognitive strategies of older children were higher than those of younger children, with an average difference of .0131, but it did not reach a significant level (P=.785). Therefore, there is no difference in cognitive strategies in terms of monthly age.

Table 5
An analysis of monthly age differences in cognitive strategies

Levene's Test for Equality of Variances			T-test for Equality of Means						
	F	Sig.	t	df	Sig.(2-tailed)	Mean Difference	Std.Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	.970	.327	.274	113	.785	.01312	.04792	-.08182	.10805
Equal variances not assumed			.275	111.730	.784	.01312	.04772	-.08143	.10766

Metacognitive Strategies

Descriptive Statistical Analysis

As can be seen from Table 6, in the strategy of monitoring of the activities, the children's average score was 2.54; in the strategy of awareness of errors and adjusting intermediate aims, the children's average score was 2.45; in the strategy of learning from one's own errors, the children's average score was 2.30. In the dimension of metacognitive strategies, the overall average score was 2.43.

Table 6
Descriptive statistical analysis of metacognitive strategies

	N	Minimum	Maximum	Mean	Std.Deviation
Monitoring of the activities	115	2.00	3.00	2.54	.501
Awareness of errors and adjusting intermediate aims	115	2.00	3.00	2.45	.500
Learning from one's own errors	115	2.00	3.00	2.30	.462
Metacognitive strategies	115	2.00	3.00	2.4319	.33906

Gender Difference Analysis

As can be seen from Table 7, the independent sample T test was used to test the gender differences in metacognitive strategies in self-regulated learning strategies. The results showed that boys' metacognitive strategy scores were higher than girls', with an average difference of .10956, but it did not reach a significant level (p = .083). Therefore, there is no gender difference in metacognitive strategies.

Table 7
An analysis of gender differences in metacognitive strategies

	Levene's Test for Equality of Variances		T-test for Equality of Means						
	F	Sig.	t	df	Sig.(2-tailed)	Mean Difference	Std.Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	.961	.329	1.748	113	.083	.10956	.06269	-.01464	.23377
Equal variances not assumed			1.746	112.132	.084	.10956	.06275	-.01477	.23390

Analysis of Monthly age Differences

As shown in Table 8, the independent sample T test was used to test the differences in metacognitive strategies in self-regulated learning strategies in terms of monthly age. The metacognitive strategies of older children were higher than those of younger children, with an average difference of .05287, and it did not reach a significant level (P=.406). Therefore, there is no difference in metacognitive strategies in terms of monthly age.

Table 8
An analysis of monthly age differences in metacognitive strategies

	Levene's Test for Equality of Variances		T-test for Equality of Means						
	F	Sig.	t	df	Sig.(2-tailed)	Mean Difference	Std.Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	.289	.592	.835	113	.406	.05287	.06334	-.07262	.17835
Equal variances not assumed			.835	112.930	.405	.05287	.06329	-.07253	.17826

Motivational Strategies

Descriptive Statistical Analysis

As can be seen from Table 9, in terms of the strategy of maintaining motivation, the children's average score was 3.01; in terms of the strategy of working autonomously, the children's average score was 2.81; in terms of the strategy of persistence on the task, the children's average score was 3.13. In terms of the dimension of motivational strategy, the overall average score was 2.98.

Table 9
Descriptive statistical analysis of motivational strategies

	N	Minimum	Maximum	Mean	Std.Deviation
Maintaining motivation	115	3.00	4.00	3.01	.093
Working autonomously	115	2.00	3.00	2.81	.395
Persistence on the task	115	3.00	4.00	3.13	.338
Motivational strategies	115	2.67	3.33	2.9826	.18120

Gender Difference Analysis

As shown in Table 10, the independent sample T test was used to test the gender differences in motivational strategies in self-regulated learning strategies, the results showed that boys' motivational strategy scores were slightly higher than girls', with an average difference of .01069, and the difference was not significant (p = .753). Therefore, there is no gender difference in motivational strategies.

Table 10
An analysis of gender differences in motivational strategies

	Levene's Test for Equality of Variances		T-test for Equality of Means						
	F	Sig.	t	df	Sig.(2-tailed)	Mean Difference	Std.Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	1.668	.199	.315	113	.753	.01069	.03394	-.05655	.07793
Equal variances not assumed			.316	112.004	.752	.01069	.03381	-.05629	.07768

Analysis of Monthly Age Differences

As shown in Table 11, the independent sample T test was used to test the differences in motivational strategies in self-regulated learning strategies in terms of monthly age. The motivational strategies of older children were higher than those of younger children, with an average difference of .04732, and did not reach a significant level (P=.163). Therefore, there is no difference in motivation strategies in terms of monthly age.

Table 11
An analysis of monthly age differences in motivational strategies

Levene's Test for Equality of Variances			T-test for Equality of Means						
	F	Sig.	t	df	Sig.(2-tailed)	Mean Difference	Std.Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	2.374	.126	1.406	113	.163	.04732	.03366	-.01937	.11401
Equal variances not assumed			1.419	102.721	.159	.04732	.03334	-.01881	.11344

Summary of Self-Regulated Learning Strategies

Descriptive Statistical Analysis

The specific scores of self-regulated learning strategies are shown in Table 12. Self-regulated learning strategies include cognitive strategies, metacognitive strategies, and motivational strategies. The average score of self-regulated learning strategies for children aged 5 to 6 was 2.57. Among the scores of the three dimensions, motivational strategies scored the highest, metacognitive strategies were in the middle, and cognitive strategies scored the lowest.

Table 12
Descriptive statistical analysis of self-regulated learning strategies

	N	Minimum	Maximum	Mean	Std.Deviation
Cognitive strategies	115	2.00	3.00	2.3043	.25579
Metacognitive strategies	115	2.00	3.00	2.4319	.33906
Motivational strategies	115	2.67	3.33	2.9826	.18120
Self-regulated learning strategies	115	2.22	3.00	2.5729	.18650

Gender Difference Analysis

As showed in Table 13, the gender differences in self-regulated learning strategies were tested by independent sample T test. The results showed that boys' self-regulated learning strategy scores were slightly higher than girls', with an average difference of .04732, and the difference was not significant (p = .175). Therefore, there is no gender difference in self-regulated learning strategies overall.

Table 13
An analysis of gender differences in self-regulated learning strategies

Levene's Test for Equality of Variances			T-test for Equality of Means					
	F	Sig.	t	df	Sig.(2-tailed)	Mean Difference	Std.Error Difference	95% Confidence Interval of the Difference
								Lower / Upper
Equal variances assumed	.026	.873	1.365	113	.175	.04732	.03466	-.02136 / .11599
Equal variances not assumed			1.367	112.988	.174	.04732	.03462	-.02128 / .11591

Analysis of Monthly Age Differences

As shown in Table 14, the independent sample T test was used to test the differences in self-regulated learning strategies in monthly age. The self-regulated learning strategies of older children were higher than those of younger children, with an average difference of .03777, and did not reach a significant level (P = .277). Therefore, there is no difference in self-regulated learning strategies in monthly age.

Table 14
An analysis of monthly age differences in self-regulated learning strategies

Levene's Test for Equality of Variances			T-test for Equality of Means					
	F	Sig.	t	df	Sig.(2-tailed)	Mean Difference	Std.Error Difference	95% Confidence Interval of the Difference
								Lower / Upper
Equal variances assumed	4.934	.028	1.086	113	.280	.03777	.03477	-.03111 / .10665
Equal variances not assumed			1.092	110.540	.277	.03777	.03458	-.03077 / .10630

Discussion

The results of this study showed that the average score of children's self-regulated learning was 2.57, which was above average overall. The average score of cognitive strategies was 2.30, which was below average. The average score of metacognitive strategies was 2.43, which was below average. The average score of motivational strategies was 2.98, which was

above average. In terms of cognitive strategies, metacognitive strategies, motivational strategies, and overall self-regulated learning strategies, boys performed better than girls, but there was no significant difference. The performance of older children (68 to 71 months) was also better than that of younger children (63 to 67 months), but the difference did not reach a significant level.

This is consistent with the results of Tong (2018), but inconsistent with the results of Zhang (2017), in which girls' self-regulated learning level was higher than that of boys. The reason may be that the tasks of the two studies were different. This study was conducted in the children's construction area, where children played puzzles, which may give boys an advantage due to gender preference.

This study shows that older children perform better in self-regulated learning than younger children, but there is no significant difference. The reason may be that the two groups of children are not much different in age, are in the same grade, and have the same learning experience.

Conclusion

Although experts and scholars in the field of education in China have repeatedly emphasized the importance of early childhood education in recent years, it is clear that there are still some early childhood educators who are unable to provide real beneficial help to preschool children, which must be taken seriously. Therefore, survey information on self-regulated learning of preschool children would be very useful. These findings are critical for preschool teachers to develop interventions to improve self-regulated learning skills of preschool children. This may provide theoretical guidance for teachers to refer to, and promote preschool teachers to establish scientific teaching concepts, adopt effective teaching methods, optimize teaching strategies, and provide children with a larger learning space, and play the main role of children to promote the development of preschool children's self-regulated learning skills.

Children's self-regulated learning can effectively stimulate their interest in learning and allow them to develop good learning habits Huang (2019), and ultimately achieve better academic performance and more ready for primary education. Therefore, teachers can improve children's self-regulated learning skills in the following aspects.

Teachers can create opportunities to nurture and support their development by pointing out the potential value of self-regulated learning skills, specifically targeting these skills for improvement (Chu et al., 2020). Teachers should update various materials in a timely manner in order to better expand children's learning experience and promote their in-depth learning (Huang, 2021). Teachers can create environments where children feel they are in control and allowed to make decisions about their own learning, rather than teacher-centered, teacher-directed teaching and learning environments (Venitz & Perels, 2018). Teachers can be willing to listen to children's ideas, create a relaxed psychological environment for children, stimulate children's desire for independent learning, create a challenging and creative material environment, and stimulate children's potential for independent learning (Xu, 2019).

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