Drama Education Influence on Creative ThinkingBased on Torrance Tests of Creative Thinking : Pre-Schools in China

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Abstracts

In advanced countries, drama education is a very important teaching method for developing students' creative thinking ability and comprehensive qualities and is even considered the best teaching method. However, in China, drama education is still in its infancy, and drama education has not been introduced for a long time. Drama education is seriously lacking in a Chinese kindergarten. But does drama education also promote the creativity of pre-school children in China? Will the age and gender of children moderate this promotion? To answer these questions, the research set a drama education experimental in Chengdu Jinjiang District Youshi Hebin Kindergarten which is a public Chinese kindergarten. This paper leverages t-tests, correlation coefficient analysis, variance inflation factor test, and an Ordinary Least Squares regression model to explore the causal relationship between drama education and pre-school children's creative thinking which is assessed by the Torrance Tests of Creative Thinking-Figural tests. Our results show that drama education has a positive impact on pre-school children's creative thinking. Furthermore, the effect of drama education on the promotion of creative thinking is more pronounced when pre-school children are older or female. Based on the above conclusions, the researcher suggests that the proportion of drama education in Chinese kindergartens should be appropriately increased to enrich the curriculum system design of kindergartens and improve the creative thinking ability of pre-school children. This study will provide some theoretical support and data for the promotion of drama education in pre-school teaching in China.

Keywords: Drama Education, Creative Thinking, Torrance Tests of Creative Thinking, Pre-Schools Children, Ordinary Least Squares Regression

Introduction

In the 21st century, media such as multimedia and the Internet have developed rapidly, and competition in the knowledge economy has become increasingly fierce. This puts forward higher requirements for future talents, and at the same time poses new challenges to China's education (Zhang, 2016). In most studies at home and abroad, there is a clear gap in the innovation ability of Chinese students compared with students from other countries (Herianto and Wilujeng, 2020). In 2012, the Chinese government promulgated the "3-6 Years Old Children's Learning and Development Guide", pointing out that creative arts education is one of the important contents of the activities carried out by kindergartens.

In advanced countries, drama education is a very important teaching method for developing students' comprehensive qualities and abilities (Zhu, 2019), and is even considered the best teaching method. However, in China, drama education is still in its infancy, drama education has not been introduced into for a long time (Fu and Yao, 2020), and in Chinese

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kindergarten teaching, its art field activities are still dominated by music and art activities, and drama teaching activities are seriously lacking. But from the relevant drama education research, it is clear that children's learning initiative and curiosity are positively correlated (Sugiarti and Husain, 2019), and their learning initiative has a profound impact on the quality of later learning (Herianto and Wilujeng, 2020). In other words, the more curious a child is, the higher his initiative will be. This also shows that in drama education activities. On the one hand, children have no presuppositions about the unknown and upcoming events in the drama education activity, and can have a strong interest in the activity. On the other hand, teachers use drama education strategies to provide children with solutions to problems. Children have the opportunity to think independently and cultivate their independence and creativity. As an intermediary between teachers and children's learning, drama education strategies can help children continue to learn and grow in the practice of drama (Zhu, 2019).

However, due to the relatively less introduction of drama education in China, there are very few studies, especially empirical studies, on drama education for the development of Chinese students' creative thinking. In this context, this research will use the Torrance Tests of Creative Thinking (TTCT) instrument to measure the level of creative thinking of pre-school children before and after receiving drama education, in order to explore the impact of drama education on the creative thinking of Chinese pre-school children. The TTCT test is one of the most widely used international instruments for measuring creative thinking and can be used in a wide range of contexts, from pre-school to postgraduate level (Yu, 2018), and the TTCT test appears to be a good measure not only for identifying and educating the gifted, but also for discovering and encouraging everyday life creativity in the general population (Kim, 2006). This study will provide some theoretical support and data for the promotion of drama education in pre-school teaching in China.

The rest of the paper is structured as follows. Section 2 reviews the related literatures. Section 3 describes the methodology used in this paper. Section 4 presents the results and discussion. Section 5 concludes the paper.

Literature Review

The Impact of Drama Education on Children's Development

On the whole, the influence of drama education on children can be reflected in the convenience of children's language development, children's sociality, children's creativity, and children's emotional development (Fu, 2017). In the process of dramatic play, children need to use spoken language to communicate with others, and they can use different emotions or voice tones according to real-time dramatic plot character changes, which promotes the development of children's language, tone of voice, and facial expressions (Lin, 2016). Rowland (2002) argued that children experience their behavior and thoughts through role-playing the story characters, which can help them gain experience in real-life problems. As found by Amabile (1983), the development of dramatic activities has a considerable impact on the development of young children's creativity. there is no fixed pattern for the development of educational drama, and learners are free to compile and improvise according to the plot, which allows learners to improve in creativity (Pearce and Jackson, 2006). According to Suo (2010), drama is one of the ways for children to vent their emotions. In drama play, children play and express the characters' emotions according to the characters' needs, which is good for children's emotional development. In the process of educational drama activities, through playing the

roles in the drama, children can reflect on the behaviors of the characters and demand their behaviors in real life (Chen, 2013).

The Influencing Factors of Children's Creative Thinking

In domestic and abroad studies on factors influencing children's creative thinking, the influencing factors are generally divided into three dimensions: 1) Genetic and biological factors. Torrance and Eisenberg's study pointed out that the age of 3-5 years is the period when children's creative thinking develops faster, with a decreasing trend after the age of 5 years (Su, 2017). Ye (2020) suggested that children's creative thinking develops with age, culminating at age 4-5; originality is highest at age 4 and begins to decline at age 5. In Spain, Prieto argues that girls are more creative than boys, which means that there are gender differences in children's creative thinking development (He, 2017). But Li (2011) stated that there are no significant gender differences in children's levels of creative thinking development. 2) Family environmental factors. Cao (2000) suggested that four factors, the family atmosphere, the concept of family education, the children's position in family education, and the parent-child relationship, also influence children's creative thinking. Diarra (2017) used a survey method to confirm that children's creativity is influenced by their cultural environment, socioeconomic status, schooling style, and parenting style. 3) Teacher Guidance. Qian (2012) showed that the children in the experimental class had improved their creative thinking levels, including originality, fluency, and flexibility after the creative thinking plays program intervention and that there were significant differences compared to the control class. Wang (2017) pointed out that in mathematics teaching, children's creative thinking is influenced by the environment, teaching situations, manipulative materials, and teachers, and of these factors, teachers' influence is the most prominent.

The relationship between Drama Education and Creative Thinking

Drama education can provide an environment for creative thinking. Isbell and Raines (2012) argued that most children in their early years will naturally exhibit creative thinking if they live in a supportive environment. Drama education is process-oriented (Van, 2021). It connects students to themselves and others transforms the traditional learning environment, and challenges students who are already considered successful under traditional paradigms (Dennis, 2021).

Drama education enriches the growth levels of creative thinking. Mayesky (2012) suggested that the best curriculum for young children to encourage their creativity is a whole curriculum that reduces artificial fragmentation of the content of the curriculum. Specifically, in an integrated drama education activity, children can experience more complete learning. Zhang (2018) divides the steps of creative drama into six: (1) Imagination; (2) Focuses; (3) Organizing, and analyzing the idea outlined in the second step; (4) Creates; (5) Self-expression; (6) Communication. In these steps, children can experience a complete and integrated learning process.

From the existing research, there is relatively little direct research on the relationship between drama education and creative thinking, and only a handful of empirical studies. However, the existing scholarly research suggests that drama education may have a significant impact on creative thinking. For example, Smogorzews and Szumski (2018) has published literature on the development of children's creativity based on the storytelling cueing method and suggested that storytelling activities are beneficial in improving young children's creative thinking.

Research Methodology

1. Research Sampling and Data Collection

The research population are 238 pre-school students of the Chengdu Jinjiang District Youshi Hebin Kindergarten which is a public kindergarten located in ChengDu City, SiChuan Province, China. This research needs to compare whether pre-school students' creative thinking ability produced significant changes before and after the implementation of drama education, therefore, a treated group participating in drama education and a control group with similar conditions to the treated group are needed. Therefore, the researcher chose Senior Class 1 & 2 which have 22 and 21 pre-school students respectively as the treated group and the control group.

To collect the data, the researcher used the Torrance Tests of Creative Thinking (TTCT)-Figural tests to assess the development of pre-school children's creative thinking before and after the drama education. The TTCT-Figural test consisted of three parts: the construction picture, the incomplete picture, and the parallel line test (Wei, 2021).

2. Quantitative Model Specification

This study will use a quantitative method to do the analysis. Specifically, this research will conduct an Ordinary Least Squares (OLS) regression model to explore the causal relationship between drama education and pre-school children's creative thinking by using Stata 17 MP2 software with fully functional license. The OLS model is shown below:

$$creativity_i = \alpha_0 + \alpha_1 lesson_i + \alpha_2 age_i + \alpha_3 gender_i + \alpha_4 experience_i + \alpha_5 influence_i + \varepsilon_i$$

The explanation of every variable is as follows:

$creativity_i$: the dependent variable of this study. Specifically, it means the difference between the creative scores before and after the drama lesson, i.e., the creative ability scores after the drama lesson minus the creative ability scores before lesson. The *creativity* consists of three parts. They are 1) *Fluency*: scored based on the number of valid drawings made by the child within the time limit, with each valid drawing being scored as one. 2) *Variability*: scored based on the number of types of drawings made by the children within the time limit, with each type being scored as one. 3) *Originality*: The teachers will evaluate the pre-school children's completed pictures individually with the help of a 5-point Likert's scale of 5 = "very unique", 4 = "unique", 3 = "average", 2 = "common", and 1 = "very common".

$lesson_i$: the independent variable of this study, i.e., whether or not to participate in the drama lesson. When the sample child attended, $lesson_i$ =1, otherwise $lesson_i$ =0.

age_i: the pre-school children's age.

$gender_i$: $gender_i = 1$ if the sample child is a boy and $gender_i = 0$ if the child is a girl.

$experience_i$: an indicator whether the pre-school children had participated in drawing lessons. $experience_i = 1$ if the sample child had participated in any drawing lessons before this experimental, otherwise $experience_i = 0$.

$influence_i$: whether the pre-school children's parents worked in the arts field, including four jobs: art, theater and film jobs, music jobs, and dance jobs. $influence_i$=1 if the sample child's parents worked in the arts field, otherwise $influence_i$=0.

ε_i is the residual term. i presents every pre-school child who participate in the drama lesson.

Research Conceptual Framework

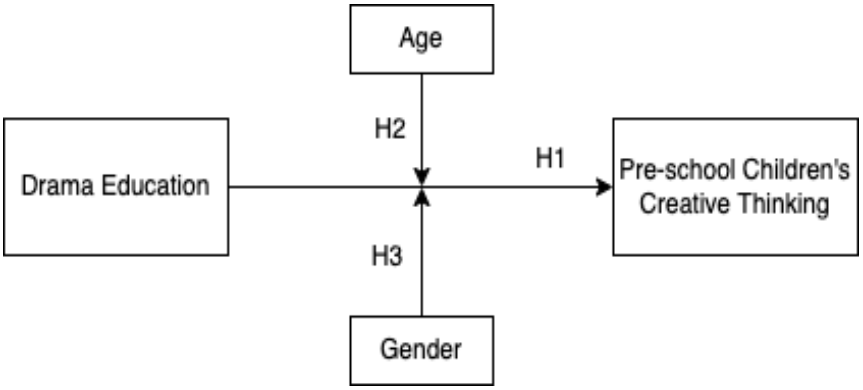

Figure1.1 Conceptual Framework

Research Results

1. Descriptive Statistics

Before regression analysis, we need to make simple descriptive statistics on the quantitative data, so as to preliminarily observe the data distribution and data form. The descriptive statistics of the all variables in this study are shown in Table 4.1. Among all the variables, *creativity1, fluency1, variability1*, and *originality1* means the TTCT ability scores before the drama lesson, and *creativity2, fluency2, variability2,* and *originality2* indicate the TTCT ability scores after the drama lesson. From Table 4.1, it can be seen that the minimum value of *creativity* is -9, the maximum is 11, and its standard deviation is 4.13. This indicates that there is a large gap in creativity ability between the treated and control group.

For the treated group (lesson=1), the mean value of their *creativity* was 1.91, which indicates that the overall creativity ability of the children in this group was improved after the drama lesson. In addition, the maximum value of *creativity* was 11 and the minimum was -5, indicating that there were different effects of the drama lesson on different individual pre-school children. Specifically, the mean value of *creativity* increased from 8 to 9.91 after the drama lesson, the mean value of *fluency* increased from 5.68 to 13.18 after the drama lesson, which was a significant increase. The mean of *variability* increased from 3.5 to 7.41 after the drama lesson, and the mean of *originality* increased from 2.86 to 3.36 after the drama lesson, i.e., the TTCT scores of the treated group all improved after the drama lesson.

For the control group (lesson=0), the mean value of *creativity* was -1.41, indicating that the overall creativity ability of the children in this group decreased during the experimental period. However, similar to the treated group, the maximum value of *creativity* for the pre-school children in this group was 8 and the minimum value was -9, indicating that different levels of creativity change existed for different individual pre-school children. Specifically, the mean value of *creativity* in the control group decreased from 7.91 to 6.5 in the two TTCT tests, and the mean value of *fluency* increased from 5.32 to 11.27, which is a significant increase. The mean value of *variability* increased from 3.41 to 5.91 in the two TTCT tests, but the mean value of *originality* decreased from 2.68 to 2.32 in the two TTCT tests.

Combining the data of the control group (lesson=0) and the treated group (lesson=1), on the one hand, before the drama lesson, the differences between the treated group's *fluency* (5.68 and 5.32 for the treated and control groups, respectively), *variability* (3.5 and 3.41 for the treated and control groups, respectively), *originality* (2.86 and 2.68 for the treated and control groups, respectively), and *creativity* (8 and 7.91 for the treated and control groups, respectively) were not significantly different from the control group, but all the scores of the treated group were better than those of the control group. On the other hand, after the drama lesson, the difference between the treated group's *fluency* (13.18 and 11.27 for the treated and control groups, respectively), *variability* (7.41 and 5.91 for the treated and control groups, respectively), *originality* (3.36 and 2.32 for the treated and control groups, respectively), and *creativity* (9.91 and 6.5 for the treated and control groups, respectively) and the control group's increased, especially the *fluency* and *creativity*, and the data of the treated group were still all better than those of the control group.

Table 1 The Descriptive Statistics

	Variables	Observations	Standard Deviation	Min	Max	Mean	Median
lesson=0	creativity	22	3.72	-9	8	-1.41	-1.5
	creativity1	22	2.94	3	13	7.91	8
	creativity2	22	2.69	3	11	6.5	6.5
	fluency1	22	2.57	1	10	5.32	6
	fluency2	22	3.15	2	15	11.27	12
	variability1	22	1.33	1	5	3.41	3.5
	variability2	22	1.11	3	7	5.91	6
	originality1	22	1.25	1	5	2.68	3
	originality2	22	1.04	1	4	2.32	2
	age	22	0.55	4.5	6.1	5.26	5.32
	gender	22	0.46	0	1	0.73	1
	experience	22	0.51	0	1	0.5	0.5
	influence	22	0.46	0	1	0.27	0
lesson=1	creativity	22	3.9	-5	11	1.91	1
	creativity1	22	2.78	3	13	8	9
	creativity2	22	3.13	5	15	9.91	10
	fluency1	22	3.01	1	10	5.68	5.5
	fluency2	22	4.33	5	19	13.18	13
	variability1	22	0.91	2	5	3.5	3.5
	variability2	22	1.68	4	10	7.41	7.5
	originality1	22	1.36	1	5	2.86	3

	originality2	22	1.53	1	5	3.36	3
	age	22	0.5	4.59	6.16	5.43	5.47
	gender	22	0.51	0	1	0.45	0
	experience	22	0.51	0	1	0.5	0.5
	influence	22	0.39	0	1	0.18	0
Total	creativity	44	4.13	-9	11	0.25	0
	creativity1	44	2.83	3	13	7.95	8
	creativity2	44	3.36	3	15	8.2	8
	fluency1	44	2.77	1	10	5.5	6
	fluency2	44	3.86	2	19	12.23	12.5
	variability1	44	1.13	1	5	3.45	3.5
	variability2	44	1.6	3	10	6.66	7
	originality1	44	1.29	1	5	2.77	3
	originality2	44	1.4	1	5	2.84	3
	age	44	0.52	4.5	6.16	5.35	5.43
	gender	44	0.5	0	1	0.59	1
	experience	44	0.51	0	1	0.5	0.5
	influence	44	0.42	0	1	0.23	0

2. *t*-test

In this study, three *t*-tests were conducted as follows.

Firstly, *t*-test on the *creativity* ability scores of the treated and control groups before the drama lesson. The result shown in Figure 4.1 indicated that there was no significant difference between the two groups.

```
. ttest creativity1, by (lesson) welch

Two-sample t test with unequal variances

   Group |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
       0 |      22    7.909091    .6273323    2.942449    6.604482    9.2137
       1 |      22           8    .5921565     2.77746    6.768543    9.231457
---------+--------------------------------------------------------------------
combined |      44    7.954545    .4263451    2.828053    7.094739    8.814352
---------+--------------------------------------------------------------------
    diff |           -.0909091    .8626675               -1.829672    1.647854
------------------------------------------------------------------------------
    diff = mean(0) - mean(1)                                      t =  -0.1054
Ho: diff = 0                     Welch's degrees of freedom =  43.8477

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.4583         Pr(|T| > |t|) = 0.9166          Pr(T > t) = 0.5417
```

Figure 1 The *t*-test on *creativity* Performance before Drama Lesson

Secondly, same t-test is leveraged on the *creativity* ability of the treated and control groups after the drama lesson. The results shown in Figure 4.2 showed that there was a significant difference in the *creativity* ability scores between the two groups.

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. ttest creativity2, by (lesson) welch

Two-sample t test with unequal variances

   Group |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
       0 |      22         6.5    .5726448    2.685942     5.30912    7.69088
       1 |      22    9.909091    .6674533    3.130633    8.521046    11.29714
---------+--------------------------------------------------------------------
combined |      44    8.204545    .5063858    3.358983    7.183321    9.22577
---------+--------------------------------------------------------------------
    diff |           -3.409091    .8794407               -5.182699   -1.635483
------------------------------------------------------------------------------
    diff = mean(0) - mean(1)                                      t =  -3.8764
Ho: diff = 0                     Welch's degrees of freedom =   42.961

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0002         Pr(|T| > |t|) = 0.0004          Pr(T > t) = 0.9998
```

Figure 2 The *t*-test on *creativity* Performance after Drama Lesson

Last, the researcher conducted a *t*-test on the difference in *creativity* ability of the treated and control groups before and after the drama lesson. The results shown in Figure 4.3 meant that the difference in *creativity* ability between the two groups was significantly different.

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. ttest creativity, by (lesson) welch

Two-sample t test with unequal variances

   Group |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
       0 |      22   -1.409091    .7940773    3.724553   -3.060465    .2422833
       1 |      22    1.909091    .8320139    3.902491    .1788233    3.639359
---------+--------------------------------------------------------------------
combined |      44         .25    .6221128    4.126629    -1.00461     1.50461
---------+--------------------------------------------------------------------
    diff |           -3.318182    1.150133               -5.636272   -1.000092
------------------------------------------------------------------------------
    diff = mean(0) - mean(1)                                      t =  -2.8850
Ho: diff = 0                     Welch's degrees of freedom =  43.9002

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0030         Pr(|T| > |t|) = 0.0060          Pr(T > t) = 0.9970
```

Figure 3 The *t*-test on *creativity* Performance Difference before and after Drama Lesson

3. Correlation Coefficient Analysis

After the descriptive statistics, this study also did the Pearson correlation coefficient analysis of the main variables which showed in Table 4.2. It can be seen that the independent variable (*lesson*) and the dependent variable (*creativity*) in this study are highly positively correlated ($\beta = 0.407^{***}$), which is in line with the theoretical analysis and research hypothesis of this study.

Table 2. The Pearson Correlation Coefficient Analysis

	creativity	lesson	age	gender	experience	influence
creativity	1					
lesson	0.407***	1				
age	0.166	0.168	1			
gender	-0.244	-0.277*	-0.123	1		
experience	0.095	0	0.047	0	1	
influence	-0.1	-0.108	0.275*	-0.211	-0.217	1

4. Variance Inflation Factor (VIF) Test

Multicollinearity among variables refers to the high correlation among the variables in the linear regression model, which makes a certain overlap and crossover among the independent variables and makes the linear regression model estimation results inaccurate. therefore, this study did the VIF test to check the multicollinearity problem. The result is shown in Table 4.3.

It can be seen that since the maximum of VIF value is less than the general empirical value of 10, therefore, multicollinearity does not exist among the main variables in this study, i.e., the selection of each variable in this study meets the selection conditions of the empirical test.

Table 4.3 The VIF Test

Variable	VIF	1/VIF
influence	1.26	0.795221
lesson	1.17	0.856305
gender	1.16	0.861537
age	1.15	0.872104
experience	1.07	0.935272
Mean VIF	1.16	

5. OLS Regression Analysis Results

Using the model constructed before, this study first tests the Hypothesis 1 that drama education has a positive impact on pre-school children's creative thinking, and the result is shown in Table 4.4. Column (1) of Table 4.4 only shows the result of drama education and creativity ability without adding any control variables to the model, while column (2) shows the result of incorporating the control variables of *age, gender, experience,* and *influence*. From the OLS results, participation in the drama lesson (*lesson*) significantly promotes the creative thinking (i.e., *creativity*) regardless of the inclusion of control variables ($\beta = 2.6831^{**}$).

Table 4 The Regression Result of Hypothesis 1

	(1)	(2)
	creativity	
lesson	3.3182***	2.6831**
	(1.1501)	(1.2400)
age		0.9407
		(1.0621)
gender		-1.3475
		(1.3503)
experience		0.5194
		(1.1431)
influence		-1.1419
		(1.5186)
_cons	-1.4091*	-5.3246
	(0.7941)	(6.0916)
N	44	44
r2_a	0.146	0.107

Note: Standard error is in parentheses, ***, **, and* is significant at 1%, 5%, and 10%.

To test the hypothesis 2, those who were older than the mean age (=5.35) were classified as the older age group, 24 in total, and those who were younger than the mean age were classified as the younger age group, 20 in total. Columns (1) and (2) of Table 4.5 show the regression results for the younger age group, and columns (3) and (4) show the regression results for the older age group. From Table 4.5, it can be seen that the effect of drama lesson on the promotion of creative thinking is more significant (β=3.2989**) for the older age group compared to the younger age group. The Hypothesis 2 assuming that the effect of drama education on the promotion of creative thinking is more pronounced when the pre-school children are older has been approved.

Table 5 The Regression Result of Hypothesis 2

	(1)	(2)	(3)	(4)
	creativity		creativity	
	(younger age group)		(older age group)	
lesson	4.2323*	2.4976	2.6713**	3.2989**
	(2.0598)	(1.7193)	(1.2695)	(1.4649)

age		7.4005*		5.4859*
		(3.7401)		(2.9832)
gender		-3.1280		2.3836
		(1.8246)		(1.8277)
experience		2.3324		-0.7847
		(1.7529)		(1.2485)
influence		-1.1377		1.6614
		(1.6287)		(1.6708)
_cons	-1.4545	-35.7765*	-1.3636	-34.9348*
	(1.4042)	(18.7929)	(0.8307)	(18.1072)
N	20	20	24	24
r2_a	0.144	0.360	0.124	0.183

Note: Standard error is in parentheses, ***, **, and* is significant at 1%, 5%, and 10%.

To test hypothesis 3, all experimental children were divided into boy group and girl group, and there were 26 and 18 children, respectively. Columns (1) and (2) of Table 4.6 show the regression results for the girl group, and columns (3) and (4) show the regression results for the boys group. From Table 4.6, it can be seen that the effect of drama lesson on the promotion of creative thinking is more significant (β=4.5061***) of girl group compared to boy group. The Hypothesis 3 assuming that the effect of drama education on the promotion of creative thinking is more pronounced when the pre-school children are female has been approved.

Table 6 The Regression Analysis Result of Hypothesis 3

	(1)	(2)	(3)	(4)
	creativity		creativity	
	(girl group)		(boy group)	
lesson	3.9167**	4.5061***	2.4000	2.4299
	(1.4937)	(1.5501)	(1.6140)	(1.6031)
age		-2.5760		2.8274**
		(1.7900)		(1.2951)
gender		0.0000		0.0000
		(0.0000)		(0.0000)
experience		-1.9599		2.2297
		(1.5566)		(1.4458)
influence		-1.1112		1.2833

		(1.3524)		(2.2241)
_cons	-1.1667	13.7599	-1.5000	-17.7893**
	(0.9816)	(9.4087)	(1.0489)	(7.0304)
N	18	18	26	26
r2_a	0.194	0.313	0.043	0.173

Note: Standard error is in parentheses, ***, **, and* is significant at 1%, 5%, and 10%.

Conclusion and Recommendations

We can draw the following three conclusions from the previous regression analysis: Firstly, drama education has a positive impact on pre-school children's creative thinking. Secondly, the effect of drama education on the promotion of creative thinking is more pronounced when pre-school children are older. Thirdly, the effect of drama education on the promotion of creative thinking is more pronounced when the pre-school children are female.

Based on the above research conclusions, the researcher mainly puts forward the following implications: on the one hand, the proportion of drama education in kindergartens should be appropriately increased to enrich the curriculum system design of kindergartens and improve the creative thinking ability of pre-school children. On the other hand, in the process of drama education teaching, teachers should pay attention to the acceptance of drama education by younger students or boys.

The main limitation of the study is the research sample size. The limited numbers of sample size which may not be generalized the results to cover the whole China country. In addition, data from other provinces in China were not used, and the resulting geographical differences may lead to some limitation in the study. Because of the historical development and cultural heritage of each province in China, the people in different province have different perceptions and acceptance of drama education. For instance, the people of Sichuan province have received a strong cultural inculcation of drama since ancient times, so the implementation of drama education in pre-school education in Sichuan province might have a possible feasibility higher than in the other provinces. Therefore, in the further study, the researcher can consider expanding the sample size, and it is best to use different data from various provinces in China.

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