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Study on the Relationship between Children's Thinking Styles and Their Ways of Raising Questions

Zongjin Yuan*
Kindergarten Teachers School
Nanjing Xiaozhuang University
Nanjing, China

***Abstract*—Ability of raising questions represents the development level of reflection of children, which has huge impact on children's physical and psychological development. This study explored the relationship between children's thinking styles and their ability of raising questions, with 180 kids aged between 5-6 years old as objects of study. The results showed that there are significant correlations between the two kids with inventive and histrionic thinking styles showed significantly higher ability of raising questions than kids with conservative thinking styles.**

Keywords—pre-school kids; thinking styles; discovering questions; educational orientation

I. Introduction

Ability of raising questions has special meaning to children. Questions raised by children are often essential and fundamental, some of which need lifetime to contemplate. If we can ever string those questions popped by children in series with the timeline clue, we will see the evolution process of questions raising in growth.

Harris believes that, children acquire information through raising questions, especially information about the culture in which they grow up. Children raise questions when they face with knowledge gaps. The potential role of raising questions is alleviates ignorance. If children tend to communicate with better informed interlocutors, they are likely to discover that their existing knowledge is limited and fragmentary. At the age of 2 and 3, children actively seek information from interlocutors via gestures or verbal questions, and display a heightened tendency to encode and store such information. [1]

Chouinard argues that, when children encounter a problem in their current knowledge state, asking questions enable them to get targeted information they need. Hence, the ability to ask questions to gather required information is a basic mechanism for cognitive development. If questioning is a driving force for cognitive development, the following should be true: (1) children must actually ask questions that gather information; (2) children must receive informative answers to their questions if they are useful for cognitive development; (3) children must be motivated to get the information they request, rather than asking questions for other purposes such as attention; (4) the questions children ask must be relevant and of potential use to their cognitive development; (5) children can ask questions for a purpose, and use the information they receive purposefully to successfully achieve some change of knowledge state. [2]

Researches on question asking of children are mainly conducted in two kinds of environment: ay home and at school. Brandenburgs has observed his/her own kid and found that: when the kid is 38-months old, 18% of the words of kid are questions, and when the kid has grown to 52-months old, 20% of the words are questions. Boyd has taken notes of the words said by his/her daughter on her birthdays. Among the 1250 sentences, 21.6% are questions. [3]

Praget has studied words of two 6-year old boys, and found that 17% and 13% of their words are questions. Nice studied a 47-month old girl, and found that during the 13-day conversation with her, only 11% are questions. Compared to studies conducted at home, studies conducted at school came with more shocking results--questions asked by children are extremely scarce, either at primary schools or middle schools.

Susskind and Terry found that, the atmosphere is the key element that has led to difference in question-asking in different classes. Class atmosphere is the spiritual environment of a class, which is reflected in the teacher-student relationship, equality of companionship, intimacy, democratic and freedom level of class regulations, students' psychological security levels, and so on. The class atmosphere which is beneficial for children's question asking should be democratic, open, equal, and intimate. [4]

Kolb (1993) points out that, some children tend to process information by observation, while some other children tend to process information by practice or interaction with the environment. The former ones like to understand new information through subjective experience, while the latter ones like to get and understand new information through interaction with the external environment. Thinking styles are defined by means of the dimension between "observation" and "practice". [5]

II. Research Method

A. Research Hypothesis

There is a significant difference among children with different thinking styles.

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B. Study Objects

This study choosed children in the third grade of kindergartens (aged 5-6 years old) through convenience sampling. 6 classes from 6 kindergartens join in this study. 15 boys and 15 girls are selected from each class.

C. Study Tools

The questionnaire contains 15 items divided into three sub-questionnaires (inventive, histrionic and conservative). Each sub-questionnaire contains 5 items. Each item is rated on a 6-point scale ranging from 1 (never) to 5 (always).

1) Questionnaire developing

To ensure that this questionnaire can reflect different kinds of children's thinking styles, the researcher had reviewed abundant literature, and collected questionnaires involving thinking styles from scholars and experts.

Researchers have their own explanation for the word "thinking styles". Belle said, "Definitions of 'thinking style' are almost as many as researchers in this field." [6]

Gregor defined thinking styles as preference on selection of either hemisphere. He argued that "Thinking styles comprise a series of behaviors which are unique and observable, which depends on preference on a specular hemisphere." [7] Smith defined thinking style as learning styles. He argued "Thinking style is a way of learning, during which the child interact with the program in a special and identified learning activity." [8]

Sternberg believes that thinking styles is a preference of thinking and using of abilities. It can't be defined as ability, whereas it is a preferable thinking way, and a kind of tendency of using ability. He divided thinking styles into three kinds: legislative, administrative and judicial. [9]

Based on literature review and observation, the researcher has divided children's thinking styles into three kinds under the hypothesis: inventive, histrionic and planning styles. And examples have been listed under each dimension of the program.

a) Items developing

The primary questionnaire was developed on basis of interviews. Here were the steps: 1) Selection of interviewees. Besides 6 psychological experts, 10 kindergarten teachers were ramdomly selected from kindergartens in Nanjing. 2) Analysis of the construction of the questionnaire. Topics mentioned by more than half of the interviewees were selected into the draft of the questionnaire. 3) Collection of information. There were 30 questions in the first version of questionnaire, with consideration of literature review and interviews. All of which are conducted with Likerts Scale, with options listed from "always" to "never".

b) Primary test and items selecting

To adapt the questionnaire to the real situation of children in kindergarten, and to find out teacher's views on children's thinking styles, the researcher worked in kindergartens for 4 months, and communicated with children and teachers, in order to familiarize the teachers with the design and assessment of the questionnaire.

30 teachers were selected for the primary test, the spherical test value was 7324.603（P<.001）, which was available for factor analysis. Some questions were deleted for violating the following standards: 1) the feature value was less than 1. 2) Factor load value was less than 0.40, and the communalities was less than 0.16. 3) Number of items in a certain factor was less than 3, though abiding by the first and second standard. After revision, 15 questions were finalized for the formal questionnaire.

c) Formal test and statistical analysis

To research on children aged 5-6 in 6 kindergartens in Nanjing, 180 questionnaires were delivered and collected from the corresponding kindergarten teachers. The effective rate was 100%. Data were analyzed by using the statistical package SPSS 11.5.

2) Reliability of the questionnaire

In the present study, the coefficients of the internal consistency (Cronbach's alpha coefficient) of the whole questionnaire are .927 and sub-questionnaires are between .920 and .946. The questionnaire had a good content validity and structural validity. As shown in TABLE I.

TABLE I. CRONBACH'S A FACTOR OF THE QUESTIONNAIRE EVALUATING CHILDREN'S THINKING STYLES

Name	*Cronbach's a factor*
Inventive	.946
Conservative	.934
Histrionic	.920
Total	.927

According to evaluation of two teachers from the relevant class, the reliability of the scorers is decided. The figure below shows significant correlation between most of the factors.

TABLE II. THE CORRELATION BETWEEN THE TWO TEACHERS ON EACH ITEM

Item	*Q1*	*Q2*	*Q3*	*Q4*	*Q5*	*Q6*	*Q7*	*Q8*	*Q9*	*Q10*	*Q11*	*Q12*	*Q13*	*Q14*	*Q15*
	q1	*q2*	*q3*	*q4*	*q5*	*q6*	*q7*	*q8*	*q9*	*q10*	*q11*	*q12*	*q13*	*q14*	*q15*
r	.769**	.553**	.521**	.603**	.593**	.496**	.238**	.387*	.563**	.447**	.345**	.558*	.461*	.515**	.431**

* P ＜.05 ** P ＜.01 *** P ＜.001

3) Validity of the questionnaire

TABLE III. CORRELATION MATRIX ANALYSIS OF CHILDREN'S THINKING STYLE QUESTIONNAIRE

	1	2	3	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*
Q1	1.00											.	.	.	
Q2	.90**	1.00													
Q3	.93**	.85**	1.00												
Q4	.83**	.77**	.76**	1.00											
Q5	.86**	.83**	.84**	.72**	1.00										
Q6	-.53**	-.50*	-.53**	-.41*	-.37*	1.00									
Q7	-.57**	-.60**	-.53**	-.52**	-.52**	.83**	1.00								
Q8	-.51**	-.55**	-.51**	-.35*	-.54**	.67**	.59**	1.00							
Q9	-.50**	-.51**	-.48**	-.36*	-.42*	.63**	.07**	.48**	1.00						
Q10	-.39*	-.35*	-.38*	-.21	-.31*	.76**	.72**	.58**	.77**	1.00					
Q11	.06	.12	.08	.04	.13	-.56**	-.62**	-.39*	-.38*	-.55**	1.00				
Q12	.14	.27	.14	.20	.21	-.61**	-.67**	-.45**	-.51**	-.61**	.81**	1.00			
Q13	.27	.33*	.31*	.19	.28	-.64**	-.69**	-.57**	-.07**	-.69**	.66**	.65**	1.00		
Q14	.056	.13	.11	-.04	.06	-.56**	-.57**	-.52**	-.44**	-.62**	.76**	.72**	.80**	1.00	
Q15	.12	.16	.15	.05	.19	-.37*	-.53**	-.47**	-.04*	-.48**	.58**	.57**	.71**	.79**	1.00

From the statistical results, we can find that the questionnaire has good internal structural validity. Three factors with eigenvalue more than 1.0 are detected from factor analysis of the questionnaire. It is shown in the screen plot below.

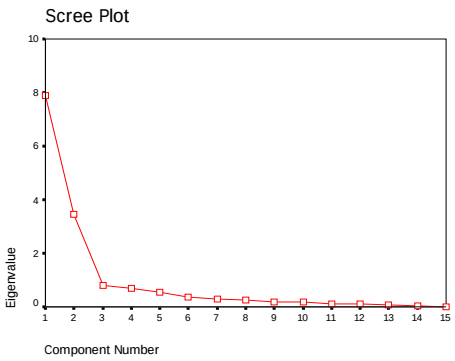

Fig. 1. Screen plot of factor analysis

Three factors are extracted by principal component analysis and rotated by varimax. The factor loading of the 3 common factors ranges from .573 to .956. Three factors can totally explain 81.030% of the questionnaire, in which inventive can explain 32.554%, histrionic can explain 35.916%, and conservative can explain 12.560%. As shown in TABLE IV.

TABLE IV. FACTOR LOADING OF CHILDREN'S THINKING STYLES QUESTIONNAIRE

Inventive	**Item Loading**	***Q1***	***Q2***	***Q3***	***Q4***	***Q5***
		.956	.873	.884	.755	.799
Histrionic	**Item Loading**	***Q6***	***Q7***	***Q8***	***Q9***	***Q10***
		.716	.819	.573	.602	.701
Conservative	**Item Loading**	***Q11***	***Q12***	***Q13***	***Q14***	***Q15***
		.723	.716	.788	.848	.599

* P <.05 ** P <.01 *** P <.001

III. CONCLUSION AND ANALYSIS

Thelen proposed the concept of "thinking style" for the first time. Then "thinking styles" has caught extensive attention and come with awarding research achievements, as it become one the key differences among children who take part in learning. The Dunn Couple, well-known experts studying thinking styles in USA, believed that thinking styles are "way of children concentrating on memorizing new knowledge and grasping new techniques." [10]

Kinsella thought, "Thinking styles is a natural and habitual preference that the learner showed in receiving, processing and storing information. It is unique as one's signature, which reflected the physical characteristics of one identity, and remarked the influence that the environment made on one identity." Thinking styles is a way of thinking when one is faced with questions or situations, a way that is preferred. The result of this research has shown significant relevance between children's thinking styles and their question-asking.

TABLE V. CORRELATION MATRIX OF THINKING STYLES AND TIMES OF QUESTION RAISING

	Inventive	**Histrionic**	**Conservative**	**Times of question raising**
Inventive	1.000			
Histrionic	.204	1.000		
Conservative	-.554**	-.748**	1.000	
Times of Question Raising	.884**	.370**	-.554**	1.000

** Correlation is significant at the 0.01 level (2-tailed).

TABLE VI. RELATIONSHIP BETWEEN THINKING STYLES AND TIMES OF QUESTION RAISING

Thinking style	**Times of question raising**	
	M	***SD***
Inventive	25.60	3.58
Histrionic	13.24	2.08
Conservative	7.58	2.71

The results of variance analysis indicate that thinking styles have significant effect on times of raising question (F=145.635, p<.001). Results of Post Hoc test shows in TABLE VII.

TABLE VII. DIFFERENCE OF TIMES OF QUESTION RAISING AMONG CHILDREN OF DIFFERENT THINKING STYLES

Thinking style		*MD*
1	2	8.22**
	3	19.46***
2	1	-8.22**
	3	17.24***
3	1	-19.46***
	2	-17.24***

1=inventive 2=histrionic 3=conservative, * P ＜.05 ** P ＜.01 *** P ＜.001

As the results of LSD test, conservative children show fewer times of question raising than inventive and histrionic children. While no significant difference is found between inventive and histrionic children. This means the ability of asking questions of children with inventive and histrionic thinking styles far outweighs that of children with conservative thinking styles. This research has verified the hypothesis, with the result that there are significant correlations between question-asking ability and children's thinking styles.

Sternberg believes that children with inventive thinking styles like to develop their own way of learning. They prefer to go with regulations made by themselves, and would rather propose and deal with non-preset questions. [11] Children with inventive thinking styles usually present curiosity by asking lots of questions, which makes the parents upset. These children tend to ask numbers of questions both at home and at school, and they tend to get away from teachers' watching in theme activities at school, which often ends with the teacher's judgment that these children are "not paying attention."

Children with conservative thinking styles seldom have time to immerse in nature, experiments or other explorative questions. Being conservative and indecisive will hinder children's development in creative ability. Children with conservative thinking styles are used to follow rules, where they might lose the ability of discovering questions. Children with conservative thinking styles also like to learn according to rules and plans, which abide with the requirement of traditional education that children should follow rules, observe disciplines and do not mind the long-time sitting in the same place. Children with conservative thinking styles prefer themes and activities which are organized, structured and ordered.

IV. SUMMARY

Children's ability of asking questions reflect the thinking development, verbal ability and cognitive development level of children, with significant influence on children's development in body and mind. Thinking styles of children are various and different from one to another. The tendency of thinking styles is a way the children choose to present themselves. Thinking styles depend on the character tendency to some extent. Meanwhile, thinking styles lead to different ways of learning and communicating, and have great impact on children's question-asking behaviors as well. There is significant correlation between frequency of children's question-asking and their thinking styles. Besides different features of children's question asking among children with different thinking styles, there is also difference in quality of questions asked by children of different thinking styles.

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