Sino-US English Teaching, December 2023, Vol. 20, No. 12, 493-500
doi:10.17265/1539-8072/2023.12.003

A Study on Gender Differences in Speech Interaction Behaviors of Preschool Teachers—Based on the Improved Flanders Interactive Analysis System (iFIAS)

Xiao Weiyao
Nanchang Normal University, Nanchang, China

The issue of the extremely imbalanced gender ratio in preschool teachers has received widespread attention, and there are few studies on teacher-child verbal interaction behavior based on gender differences in preschool teachers. This article takes the "Little Light Bulb Is On", a scientific exploration activity done by 5-6 years old kindergarten students as an example, and uses the improved Flanders Interaction Analysis System (iFIAS) as a tool to analyze the speech interaction behavior of male and female preschool teachers. The research results indicate that there are gender differences in teacher child language interaction between male and female teachers in terms of the atmosphere, the teaching structure, the teaching tendency, the way of raising questions, and the overall trend of interaction.

Keywords: verbal interaction, gender differences, Flanders Interactive Analysis System, kindergarten science activities

Introduction

Speech, as an important medium for teaching activities, has functions such as transmitting information, expressing emotions, and establishing social connections. In a sense, the best way to evaluate a class is to conduct an interactive analysis of the teacher-student speech behavior in the classroom, since grasping the essence of teaching requires grasping the teacher-student speech behavior in teaching. The issue of gender imbalance in early childhood teachers is becoming increasingly prominent, and current research on gender differences in teacher child verbal interaction is relatively weak. The Flanders Interaction Analysis System (FIAS) is a structured and quantitative classroom speech act analysis technique proposed by American scholar Ned Flanders through field study. It is still an ideal tool in the Western education community for analyzing and evaluating teaching behavior and conducting educational research. Currently, it is widely used in teaching research in primary and secondary schools, but it is rarely used in kindergarten teaching analysis. This article selects two parallel classes named "The Little Light Bulb Is On" by 5-6 years old kindergarten children as an example, and analyzes the teaching behavior of two preschool teachers of different genders through a combination of on-site observation and video recording. These two teachers graduated from the same undergraduate normal university and currently work in two provincial-level kindergartens in Nanchang City, Jiangxi Province, with the same teaching experience of three years. Using the improved Flanders Interaction Analysis System (iFIAS) as a tool, we strive to objectively present the gender differences in language interaction styles of preschool teachers in specific kindergarten teaching activities.

Xiao Weiyao, M.A., lecturer, Department of Education, Nanchang Normal University, Nanchang, China.

Flanders Interactive Analysis System and Its Improvement

Introduction to the Flanders Interactive Analysis System

The Flanders Interactive Analysis System is roughly composed of three parts: Flanders Interactive Analysis Coding System, also known as the Scale; explanation of the prescribed standards for coding; data analysis matrix table. As shown in Table 1, Flanders divides classroom language interaction into three categories: teacher language, student language, and silence or chaos (no effective speech activity), with a total of 10 types represented by Codes 1-10.

Table 1

Flanders Interactive Analysis System

Classification		Coding	Content
Teacher's speech	Indirect impact	1	Expressing emotions
		2	Praise or grunt
		3	Accepting or using students' claims
		4	Asking questions
	Direct influence	5	Teach
		6	Provide guidance or instructions
		7	Criticize or maintain authority
Student language		8	Students speak passively
		9	Students actively speak
Silence or confusion		10	Invalid language

In classroom observation, the observer records the corresponding code number according to the meaning specified by the coding system every three seconds. According to this rule, a collective teaching activity in kindergarten records about 500-700 codes, which reflect a series of events that occur in a chronological order in the classroom, presenting the emotional atmosphere, structure of teaching, teaching tendencies, and questioning types. Pairing and combining these two events (numbers) into a coordinate system each time, the first number represents the horizontal column of the matrix and the second number represents the vertical row of the matrix. For example, if the classroom teacher-student language behavior code is 7-3-3-4-1-5-5, the previous code and the following code will be "ordered" (7, 3), (3, 4), (4, 1), (1, 5), (5, 5) … (7, 3) represents counting one in the grid of Row 7 and Column 3, and filling in the frequency of all order pairs in the corresponding positions of the matrix table is to form the Flanders transfer matrix. Based on the frequency distribution of various teaching behaviors in the matrix and the proportional relationship between frequencies, a meaningful analysis of classroom language interaction can be conducted.

Improved Flanders Interactive Analysis System

Although the Flanders interaction analysis system can generally present the situation of teacher child interaction in the classroom, there are still some shortcomings in introducing it into collective teaching in kindergartens. If we attach importance to teacher language (Category 7) and ignore children's language (Category 2), it is difficult to fully and truly present children's reactions. Regarding raising questions, in terms of teaching, the success or failure of a teacher's questioning design is related to the effectiveness of teaching, while the Flanders analysis system does not provide a detailed breakdown of the teacher's questioning categories. In addition, in collective teaching activities in kindergartens, teachers and young children often engage in rich interactive activities with operating materials. If the silence and noise during this process are only attributed to

Code 10, it will distort the meaning of teaching. In view of this, on the basis of retaining the original matrix analysis function of the Flanders Interactive Analysis System, the author has made some adjustments and optimizations to it, adding categories of children's speech content and nonverbal content, which can reflect the content of materials (teaching aids, and media) and teacher child interaction. In addition, the Flanders Interactive Analysis System is combined with descriptive observation methods to achieve complementary quantitative and qualitative research, in order to objectively reflect the actual teaching activities of kindergartens (see Table 2).

Table 2

Improved Flanders Interactive Analysis System

Classification		Coding	Content		
Teacher's speech	Indirect impact	1	Expressing emotions		
		2	Praise or grunt		
		3	Accepting or using students' claims		
		4	Asking questions	4.1	Ask open-ended questions
				4.2	Raise closed questions
	Direct influence	5	Teach		
		6	Provide guidance or instructions		
		7	Criticize or maintain authority		
Student (toddler) speech		8	Passive speaking by students (young children)		
		9	Students (young children) actively speak	9.1	Active response
				9.2	Students' discussion
Silence		10	Helpless in teaching		
		11	Helpful silence in teaching		
Material		12	Teacher operation materials		
		13	Preschool operation materials		
		14	The role of materials in young children		

Comparative Analysis of the Observation Results of Teacher-Child Interaction Behavior in Teaching Activities Between Male and Female Preschool Teachers

Comparison and Analysis of the Observation Matrix of Teacher Child Interaction Behavior in Teaching Activities Between Male and Female Preschool Teachers

According to the analysis of Franz interaction, the researcher code the two "Little Light Bulb Is On" teaching activities taught by preschool teachers of different genders to form the Franz interaction analysis matrix shown in Tables 3 and 4.

Table 3

Interactive Analysis Matrix of Female Teachers' Teaching Activity Record

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Total
1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	2
2	0	1	0	3	2	4	0	0	0	1	0	0	1	0	12
3	0	4	3	1	6	3	1	0	0	2	0	0	0	0	20
4	0	0	0	12	1	6	1	77	2	5	0	1	1	0	106
5	0	0	0	17	43	3	2	1	2	1	0	16	2	0	87
6	0	1	0	10	3	15	5	12	4	2	0	12	11	0	75
7	0	0	0	5	1	5	4	3	0	2	0	0	1	0	21
8	2	3	13	20	9	6	4	19	5	4	0	3	25	0	113

(Table 3 to be continued)

9	0	1	2	6	2	3	0	0	9	0	0	0	15	0	38
10	0	0	0	9	2	5	1	0	1	11	0	0	3	0	32
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	1	1	17	8	0	1	1	1	0	1	2	0	33
13	0	1	1	21	1	17	3	0	14	3	0	0	26	0	87
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	2	12	20	106	87	75	21	113	38	32	0	33	87	0	626

Table 4

Interactive Analysis Matrix of Male Teachers' Teaching Activity Record

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Total
1	0	1	4	1	2	0	0	0	1	0	0	0	1	0	10
2	0	2	0	13	4	0	0	1	2	0	0	2	12	0	36
3	1	12	3	15	4	1	0	0	6	0	0	1	1	0	44
4	0	0	0	3	1	0	0	95	2	2	0	0	3	0	106
5	0	0	0	6	10	5	0	0	12	2	0	30	5	0	70
6	0	0	0	2	4	1	2	0	4	2	0	8	10	0	33
7	0	0	0	0	0	2	1	0	0	0	0	0	1	0	4
8	4	9	25	26	6	5	0	2	8	0	0	5	14	0	104
9	3	6	11	7	9	2	0	0	24	0	0	6	2	0	70
10	0	0	0	0	2	2	1	1	0	13	0	1	0	0	20
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	1	1	11	26	6	0	2	6	0	0	3	1	0	57
13	2	5	0	22	2	9	0	3	5	1	0	0	44	0	93
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	10	36	44	106	70	33	4	104	70	20	0	56	94	0	647

Comparative analysis of emotional atmosphere between teachers and children. Some cells in the Flanders interaction analysis matrix can reflect a specific interaction behavior of the teacher, such as the intersection area between Rows 1-3 and Columns 1-3 (as shown by gray shadow A in Table 3 above), which is called positive and qualified, indicating the teacher's positive behavior. If this intersection area is frequent, it indicates a harmonious emotional atmosphere between teachers and children in the classroom. The intersection area between Rows 7-8 and Columns 6-7 (as shown by the gray dot shadow B in Table 4 above) is called the defect grid. If this grid appears frequently, it indicates a gap in emotional communication between teachers and children in the classroom.

Table 5

Analysis of Emotional Atmosphere of Male and Female Teachers

Gender category	Number of positive rectification passes	Number of defect grids	Ratio of positive rectification to defect qualification (%)
Female teacher	9	19	47.37
Master	23	8	287.5

As shown in Table 5, the frequency of female teachers falling into the positive and negative categories is 9 and 19, respectively. The frequency of the latter is more than twice that of the former, indicating that the teacher and child emotions in the teaching activities organized by the teacher are more tense. Female teachers are more

inclined to use criticism and commands to support the activities, and there is a gap in the emotional interaction between teachers and children. In the interactive analysis matrix of male teachers' teaching activities, the frequency of falling into the positive and qualified category is 23, and the frequency of falling into the defective category is 8. The frequency of falling into the positive and qualified category is much higher than that of falling into the defective category, with a ratio of 287.5% between the two, indicating that the atmosphere of the activity is relatively relaxed and the interaction between teachers and children is harmonious. It is found that female teachers tend to shape the image of authority, hoping that young children can follow their own teaching rhythm; male teachers, on the other hand, teach with humor, support various ideas and attempts of young children, and maintain an equal teacher-child relationship.

Comparative analysis of teachers' teaching tendencies. The Flanders Interactive Analysis System divides the influence of teachers' teaching language on students into two types from the perspective of teaching control: direct influence and indirect influence. From the perspective of teaching effectiveness, teaching language is divided into two types: positive reinforcement and negative reinforcement, which reflects the teacher's teaching style inclination.

Table 6

Analysis of Teaching Styles of Male and Female Teachers

	Master	Female teacher
Indirect impact (number of Columns l-4)	224	140
Direct impact (5-7 column count)	108	184
Ratio of indirect impact to direct impact (%)	207.41	76.09
Positive reinforcement (1-3 column times)	118	34
Negative reinforcement (6-7 column times)	37	96
Ratio of positive reinforcement to negative reinforcement (%)	318.92	35.42

As shown in Table 6, the proportions of female and male teachers using indirect language to influence young children and using direct language to influence young children are 76.09 and 207.41, respectively. The former proportion is less than one, while the latter proportion is much greater than one, indicating that female teachers are more inclined to use directly influenced language in teaching activities, while male teachers are better at using indirectly influenced teaching language. In terms of maintaining teaching effectiveness, the ratios of positive reinforcement and negative reinforcement for female and male teachers are 35.42 and 318.92, respectively. Positive reinforcement includes the first four types of speech acts, namely receiving emotions, praising or encouraging, and accepting or adopting young children's perspectives. Negative reinforcement includes six and seven types of speech acts, namely giving guidance or instructions, and criticizing or maintaining authority. Due to male teachers' preference for abstract logical thinking, their teaching style in education is more flexible and passionate than that of female teachers, and they use less directive and critical language to control teaching. This is also related to the high tolerance of males.

The gentle and meticulous psychological characteristics of female teachers lead them to pay more attention to the details of teaching. Teachers have an accurate grasp of the classroom, including accurate and standardized teaching language and operation demonstrations, as well as a keen awareness of children's language expression and awareness to seize educational opportunities. In this regard, female teachers are slightly better than others. For example: In the first part of study of male and female teachers, young children experienced the problem of placing batteries in the insulation part of the wires, which caused the light bulb fail to light up in both cases. The

two teachers responded differently: The female teacher quickly noticed this problem and promptly guided the children to "try a different place and see what would happen", thus introducing the concept of "insulation"; the male teacher's response to the young children is "the wires are on top just like batteries, and without the way of hand in hand, there would be no telepathy!" Although this response is more appealing to young children, it is not very helpful for their acquisition of scientific cognition.

Comparative analysis of classroom language structure. According to the improved Flanders Interactive Analysis Coding System, the frequency of each code number occurrence is statistically analyzed. According to the corresponding calculation formula, a statistical table for the ratio of male and female teachers' language structure in teaching activities is obtained, as shown in Table 7:

Table 7

Statistics on the Ratio of Language Structure in Teaching Activities of Male and Female Teachers

Category	Calculation formula	Male teacher ratio	Female teacher ratio
Teacher's language	Sum of 1-7th column times/total times	46.83	51.76
Active speech of young children	Sum of 9th column times/8-19 column times	40.23	25.17
Teacher's questions	Sum of 4th column times/4-5 column times	60.23	54.64
Open ended questions	Times in Column 4.1/times in Column 4	45.28	20.75
Closure issues	Times in Column 4.2/times in Column 4	54.72	79.25

The speech ratios of male and female teachers are 46.8 and 51.76, respectively, which are lower than the norm of 68, indicating that the two teachers have a more democratic teaching language style and delegate more discourse power to young children, presenting an interactive classroom. Furthermore, by comparing the active speech of young children, it was found that in the teaching activities of male teachers, the active speech of young children was 40.23, much higher than that of female teachers. This is related to the classroom atmosphere previously analyzed. Due to male teachers being more inclined to accept and encourage young children's ideas, the teacher-child communication atmosphere is harmonious, making it easier to stimulate young children to speak boldly. In terms of teacher questioning ratio, the female teacher questioning ratio is 54.64, and the male teacher questioning ratio is 60.23. Both teachers are good at using questioning to stimulate children's positive thinking. The improved version of the Flanders Interactive Analysis System divides teacher questioning into two categories: open and closed questions. The closed question ratio and open question ratio for female teachers are 79.25 and 20.75, respectively, while the closed question ratio and open question ratio for male teachers are 54.72 and 45.28, respectively. Foreign studies have pointed out that when the level of behavioral complexity emphasized in classroom content is low, the optimal ratio of closed questions to open questions is 7 to 3. When the level of complexity emphasized in classroom content is high, the optimal ratio of the two is 6 to 4 (Borich, 2009). Male teachers present a more ideal situation in teaching questioning compared to female teachers, and are better at using divergent questions to trigger children's thinking activities.

Conclusion and Suggestions

By using the Flanders Interaction Analysis System to quantitatively analyze the teacher-child interaction behavior of male and female teachers in teaching activities, the author found that although the teaching content is basically the same, the teaching interaction behavior of male and female teachers reflects their gender differences. In terms of classroom atmosphere, as shown in Table 5, male teachers have a more relaxed classroom atmosphere, while female teachers tend to play the role of authoritative figures, hoping to help young children

keep up with the pace of teaching through their own guidance; male teachers, on the other hand, form equal and mutually supportive partnerships with young children, using less critical and authoritative language in teaching activities, and are more adept at creating a relaxed atmosphere in the classroom with exaggerated and humorous language. In terms of teaching tendencies, as shown in Table 6, male teachers are more adept at using indirectly influenced teaching language, such as accepting emotions, praising or encouraging, accepting or adopting children's perspectives and questions, to penetrate the classroom, and providing more positive reinforcement to children in maintaining teaching effectiveness. However, female teachers are more eager to provide guidance and criticism to children when they make mistakes in speaking or operating. Therefore, in the classroom structure, male teachers have a higher speech rate among young children in their teaching activities (see Table 7). In teaching questioning, male teachers have twice the rate of open-ended questions as female teachers (see Table 7), and are better at using divergent questions to trigger children's thinking activities. In terms of overall interaction trends, female teachers are better at controlling the classroom and have a higher utilization rate of classroom language, presenting the "monosyllabic function" of classroom language. However, male teachers have more active interaction with young children, reflecting the "dialogue function" of classroom language. However, there is a lack of grasp of language and details in children's operation activities, and their sensitivity to children's language reflection is weak. In the process of children's operation, language guidance is not as targeted as female teachers.

Therefore, in order to achieve the interactive and isomorphic teaching process of "young children actively learn and teachers actively and effectively teach", the following suggestions are proposed for male and female teachers. The "Outline" and "Guidelines" both demonstrate the spirit of putting young children as the main body. Female teachers should first change their top-down authoritative role positioning, squat down and have an equal dialogue with young children, make themselves helpers and supporters of young children, and create a relaxed and free atmosphere of scientific exploration. Secondly, scholars Deng Jin and Bide have found in their research: Indirect teaching can promote students' participation, trigger more speech, stimulate students' motivation, encourage students' initiative and creativity, reduce students' anxiety, and improve students' academic performance (N. A. Sprinthall & R. C. Sprinthall, 1990). Female teachers should adapt to the direct influence of teaching, directive, and critical language, such as accepting emotions, praise, accepting students' opinions, and other indirect influence words, and accept children's wrong words and operations, Errors are a common phenomenon in young children's scientific exploration. The theory and practice of science education have confirmed that errors are constructive in young children's scientific exploration and experience accumulation. Finally, in terms of teaching questioning, attention should be paid to using open-ended questions to stimulate children's positive thinking. Male teachers should maintain a humorous teaching style, have equal relationships with children, and have a harmonious classroom atmosphere. At the same time, they should pay attention to the grasp of classroom details, be good at capturing appropriate educational opportunities, judge children's cognitive level and needs, and provide support and guidance for children's next exploration.

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