

Inspiration from Research on Preschool Color Preferences for Kindergarten Environment Creation

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Abstract: This study used double comparison and testing methods, using 11 square color images as experimental materials to present colors and explore the color preferences of preschool children aged 3-6 in a public kindergarten in Chengdu. The results showed that the color preferences of children aged 3-6 from high to low were yellow, green, orange, red, and blue, with young children preferring bright and bright colors; There is no age difference in children's color preferences, but there is a significant gender difference. Girls like yellow, while boys like green; Girls are more willing to choose their favorite colors than boys.

Keywords: young children, color preferences, kindergarten environment creation

Introduction

Color is a visual experience that affects the human eye through the action of light waves. It is a stimulus generated during the process of human contact with the external environment, which triggers people's perceptual reactions. Through association and recall, a series of psychological changes related to color are generated, further affecting high-level psychological activities such as thinking and cognition. With the growth of young children, the influence of color preference on their cognitive activities gradually becomes prominent.^[1] In early childhood, children mainly contact and perceive the world through intuitive thinking, and color, as a very common visual stimulus, can have a very intuitive impact on children's cognition of things. Artists and interior designers have long believed that color can greatly affect emotions, feelings, and mood. In the spectrum of color psychology, the red side is called warm color, which evokes various emotions from warmth and comfort to anger and hostility; The blue side is called a cool color, which is usually described as calm but can also evoke feelings of sadness or indifference. Some ancient cultures, including Egyptian civilization and traditional Chinese culture, use color therapy to treat diseases or psychological problems. So, whether it's healing emotions, cognitive development, or warm and comfortable feelings, color plays a very important role in the creation of kindergarten environments.

1. Question raising

In 1881, Preyer was the first to study color preferences abroad. W. Preyer found that by 42 days after birth, babies begin to exhibit a noticeable sense of pleasure towards colored objects.^[5] It indicates that color perception is already present during infancy and continuously changes due to factors such as age, environment, and culture, which is an important factor affecting the emotional development of young children. In China, a large number of studies in the early stages of education have pointed out important factors that affect children's color preferences. In terms of gender factors,

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Marilyn A.'s research conducted interviews with children aged 3-5 using hierarchical ranking and semi-structured interview methods. The research results indicate that in indoor environments, young children prefer red, girls tend to prefer purple, and cool colors are more popular than warm colors.^[4] Zeng Bin et al. analyzed the art works of 126 4-6 year old children and found that girls prefer red, pink, orange, purple, green, and black, while boys prefer yellow and blue.^[7] In terms of the changing factors of the times, in the 1960s, Chen Li and Wang Ansheng conducted a color preference experiment on preschool children, and the results showed that the color preference order of young children was red, blue, green, and yellow.^[1] At the beginning of the 20th century, scholars such as Liu Shaoying focused their research on young children aged 4-6. Through exploring their color preferences, it was found that at this age group, their color preferences were in the following order: red, yellow, orange, blue, purple, and green.^[3] Children's preferences for colors have undergone significant changes in different eras. For example, in the 1960s, children's favorite red color ranked later in the 1980s, but then returned to first place in the early 20th century. In recent years, the order has been relatively lower, which may be related to the national style at that time. Zane Curry believes that color is an important element in the creation of kindergarten environments, as its impact on children is generated from both physiological and psychological aspects.^[2] Children have the most vivid vitality and creative creativity. How do they think and understand colors? This study mainly explores the following three questions?

1. What are the overall results of color preferences among children aged 3-6?
2. How is the relationship between color preference and age, class, and gender?
3. What are the inspirations of color preferences for environmental creation?

2. Research methodology

2.1 Research objects

This study adopted stratified random sampling and selected 115 children aged 3-6 from a public kindergarten in Chengdu as the research subjects, including 63 boys and 52 girls; There are 32 children in the small team, 38 children in the middle team, and 45 children in the large team. And conduct color vision screening on the subjects to exclude children with color weakness and color blindness. The gender and age distribution of the participants are shown in Table 1:

Table 1 Frequency of age and gender distribution of participants in color preferences experiment (N=115)

	Small class	Medium class	Large class
Male toddlers	16	20	27
Female toddlers	16	18	18
M	3.35	4.41	6.20
SD	0.38	0.42	0.51

2.2 Research tools and methods

According to the standard RGB values, adjust the display on the computer to 11 colors: red, orange, brown, blue, purple, gray, yellow, green, pink, black, and white.

During the research, the dual comparison method and testing method were mainly used. First, the 11 color color swatches were cut into squares with a side length of 8cm, and then the 11 color squares were paired together for a total of 55 combinations. In order to balance the presentation order of the pairwise combination, one color is used as a control, and the first group of control colors is removed for the second time. They are arranged in 10 control groups. The subjects select two color blocks presented simultaneously, judge and tell the subjects which color they prefer. Preschool children can point out or say their favorite color blocks with their hands.

2.3 Data processing

This study uniformly numbered and entered the collected data, analyzed the data using SPSS statistical software, and examined the overall situation of children's favorite or preferred colors through Z-score conversion. The color preferences of children of different age groups and genders were analyzed, and chi square tests were conducted on the color

preferences of children of different age groups and genders to obtain the differences in color preferences on gender and age.

3. Research results

3.1 Overall results of children's color preferences

The participants selected two colors from a set of 55 pairs of colors, and could only choose one color. The total number of times each color was selected was counted to obtain a raw data - the original F-matrix.^[6] The number of people in the F matrix divided by the total number of people judged by dual comparison can obtain a P matrix. Then, each P value is added to the 0.5 points obtained by self comparison and averaged, which is converted into a Z score. Based on the Z score, a color preference order scale is drawn. Therefore, the higher the Z-score, the more children prefer that color. When the Z-score is negative, it indicates that the result is below the average level. From Table 2, it can be seen that at present, young children prefer yellow the most, followed by green, orange, red, and blue, black the least, followed by brown, white, pink, purple, and gray. From this, it can be seen that compared to previous studies, children's favorite colors of blue and red have changed to yellow.

Table 2 Overall Results of Children's Color Preferences (N=115)

Sort	1	2	3	4	5	6	7	8	9	10	11
Colour	Yellow	Green	Orange	Red	Blue	Grey	Purple	Pink	White	Brown	Black
Z	1.30	1.06	0.95	0.91	0.56	-0.11	-0.39	-0.67	-0.99	-1.13	-1.51

3.2 Age differences in color preferences among young children

The results of color preferences among children of different age groups are shown in Table 3. Different age groups include small, medium, and large classes. As shown in Table 3, children of different age groups have different color preferences. At different age groups, children's favorite colors that are higher than the average are yellow, red, orange, green, and blue; Their least favorite colors are black and brown. The most preferred colors for children in small classes are blue, red, yellow, orange, green, and gray, with gray just above the average value; The least favorite colors are white, black, purple, pink, and brown in order. The most preferred colors for children in the middle class are green, yellow, orange, red, white, and blue, with blue just above the average value; The least favorite colors are brown, black, pink, gray, and purple in order. The most preferred colors for preschoolers in large classes are yellow, orange, green, red, and blue in order; The least favorite colors are black, brown, white, pink, gray, and purple in order.

A chi square test was conducted on the color preferences of children of different age groups, and the results showed that there was no significant difference in their color preferences ($X^2=56.84$, $P>0.05$). There was no significant difference in color preference among male students in different age groups ($X^2=130$, $P>0.05$), while there was no significant difference in color preference among female students in different age groups ($X^2=125$, $P>0.05$).

Table 3 Color preferences results of children of different age groups (N=115)

Sort	1	2	3	4	5	6	7	8	9	10	11
Small class	Blue	Red	Yellow	Orange	Green	Grey	Brown	Pink	Purple	Black	White
Z	1.19	1.10	1.01	0.82	0.46	0.00	-0.27	-0.64	-0.73	-1.19	-1.74
Medium class	Green	Yellow	Orange	Red	White	Blue	Purple	Grey	Pink	Black	Brown
Z	1.66	1.52	0.55	0.28	0.14	0.00	-0.28	-0.28	-0.97	-1.24	-1.38
Large class	Yellow	Orange	Green	Red	Blue	Purple	Grey	Pink	White	Brown	Black
Z	1.16	1.08	1.01	0.93	0.23	-0.08	-0.08	-0.39	-0.77	-1.47	-1.62

3.3 Gender differences in color preferences among young children

Table 4 shows the preference results for colors among young children of different genders. The most preferred colors for boys are green, yellow, red, orange, and blue in order; The least favorite colors are pink, white, black, purple, brown, and gray in order. The most preferred colors for girls are yellow, orange, red, pink, blue, gray, and green; The least favorite colors are gray, brown, white, and purple in order. The boy ranked the girl's favorite pink as the 11th, which is the last one. But for both boys and girls, yellow, orange, red, and blue are in the top five of their favorite colors, while their least favorite colors are black, white, purple, and brown.

A chi square test was conducted on the color preferences of children of different genders, and there was a significant difference in color preferences among children based on gender ($X^2=29.70$, $P<0.01$). There are significant differences in color preferences among children of different genders in the small class ($X^2=17.38$, $P<0.01$), significant differences in color preferences among children of different genders in the middle class ($X^2=21.52$, $P<0.01$), and significant differences in color preferences among children of different genders in the large class ($X^2=27.46$, $P<0.01$).

Table 4 Color preferences results of children of different genders (N=115)

Sort	1	2	3	4	5	6	7	8	9	10	11
Male toddlers	Green	Yellow	Red	Orange	Blue	Grey	Brown	Purple	Black	White	Pink
Z	1.54	1.21	0.77	0.72	0.61	-0.33	-0.55	-0.55	-0.94	-1.10	-1.38
Famale toddlers	Yellow	Orange	Red	Pink	Blue	Grey	Green	Purple	White	Brown	Black
Z	1.10	1.03	0.88	0.44	0.37	0.22	0.15	-0.07	-0.59	-1.61	-1.90

4.Conclusion

Under the conditions of this study, the following four conclusions can be drawn:

- (1) The order of color preferences for children aged 3-6 from high to low is yellow, green, orange, red, and blue, with young children preferring bright and bright colors.
- (2) There is no significant age difference in children's color preferences, but there will be differences in color preferences in rankings among different age groups.
- (3) There is a significant gender difference in the color preference of young children, with girls preferring yellow and boys preferring green.
- (4) During the experiment, girls were more clear about their color choices compared to boys, and fewer people asked questions or made choices again. They were more determined to determine their favorite color, indicating that girls had a clearer preference for colors and knew what colors they liked and didn't like.

Conflicts of interest

The author declares no conflicts of interest regarding the publication of this paper.

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