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Empirical Study of Hangzhou Children's Hospital Visual Identity Based on Developmental Psychology

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ABSTRACT

Based on developmental psychology, the impact of visual identity in children's hospitals on children's emotional experience and psychological development during medical treatment is investigated. This study investigated and analyzed the visual identity of children's hospitals in Hangzhou, China. A questionnaire survey was conducted with children aged 6-14 and their guardians to investigate the design uniformity and appropriateness of the visual identity of children's hospitals by dimension. The impact of visual identity on children attending the hospital was investigated and analyzed. The rationality of the theoretical model and data was verified by SPSS, and finally, the overall feedback of children of different age groups on the visual environment of hospitals during their visits was empirically explored, as well as the psychological impact of visual identities appearing in children's hospitals on children. The study attempts to provide guidance for creating a healing and comforting healthcare environment that is relevant for promoting a positive emotional experience for children in hospitals.

KEYWORDS

Developmental psychology, Children's hospital Visual Identity, Design improvement, Visual Identity

THEORETICAL BACKGROUND AND RESEARCH STATUS

Research Purpose

As paediatric medical technology improves and society advances, there is growing concern not only about the level of care and services in children's hospitals, but also about the development of the mental health of children seeking care. Most studies have been biased towards the fields of psychology, nursing, and hospitals. However, many researchers have overlooked the importance of the environment as a factor influencing psychological changes in children (Golembiewski JA, 2016). Vision is an important sense for children and guardians to experience the hospital environment, and the Visual design of children's hospitals is an important factor in creating a healing and positive environment for children receiving treatment (Ullán AM and Belver MH, 2021). Research in developmental psychology has shown that visual elements in hospital design can be effective in promoting positive emotional experiences, alleviating stress and anxiety in pediatric patients, and providing better care for their caregivers. Because children are more mentally vulnerable than other social groups, the design of visual applications in children's hospitals is particularly important (Ullán AM and Belver MH, 2021).

The purpose of this study is to investigate the impact of Children's Hospital Visual Identity on children's emotional experience and psychological development during the medical process. Firstly, a survey was conducted to analyze the visual identity of Hangzhou children's hospitals, secondly, to investigate the feedback and influence of Chinese children aged 6-14 on hospital visual identity, and finally, to derive and analyze the specific impact of children's hospital visual identity on children's medical process through research data and models. To guide children's hospitals to create a visual environment that is more in line with children's psychological health development.

Developmental Psychology

Developmental psychology is the scientific study of how and why humans grow, change, and adapt throughout their lives. Originally concerned with infants and children, the field has expanded to include adolescence, adult development, aging, and the entire lifespan (Graber JA and Brooks-Gunn J, 1996). Developmental psychology typically divides lifelong development into the following broad age stages: infancy and toddlerhood (birth to 3 years); preschool (3 to 6 years); middle childhood (6 to 12 years); adolescence (12 to 20 years); early adulthood (20 to 40 years); middle adulthood (40 to 65 years); and late adult-

hood (65 to death). Developmental psychologists aim to explain how thinking, feeling, and behaviors change throughout life (Burman E, 2017). This field examines change across three broad dimensions: physical development, cognitive development, and social emotional development. Related research theories cover a wide range of areas. Research in developmental psychology has some limitations, but researchers are currently working to understand how transitions through life stages and biological factors may affect our behavior and development (Kobak R, Abbott C, Zisk A, Bounoua N, 2017).

Children's Hospital Visual Identity

World Health Organization: A hospital is a health institution providing patient treatment with specialized health science and auxiliary health personnel and medical equipment (2018). The criterion of under 14 years of age is derived from medical judgment. The Medical textbook Pediatrics (7th Edition), published by the People's Health Publishing House of China, includes under 14 years of age as the age criterion for children. This criterion was established because children differ from adults in terms of their physiological condition, disease types, clinical manifestations, diagnosis and treatment, and prognosis and prevention, and should be specifically addressed.

No one can grow up without a hospital, and the hospital environment greatly affects the psychological development of children. More than 90% of children reported that they were afraid of at least one thing while in the hospital (Salmela M, Salanterä S, Aronen E, 2009). Most fears were categorized by nursing intervention, fear of becoming a patient, and fears arising from the child's developmental stage. Children also express fear due to unfamiliar surroundings or lack of information, child-staff relationships, and physical, social, and symbolic environments. With the development of society and the influence of national policies, the number of children's hospitals in China is gradually increasing. However, there is a paucity of research related to the visual identity of children's hospitals in China. By far, the United States is the most published country in this field, followed by Australia and the United Kingdom (Ullán AM and Belver MH, 2021).

The importance of developmental psychology for the Visual Identity of children's hospitals

As a health care organization dedicated to children, children's hospitals need to pay constant attention to children's experiences and feedback. Health is a

pillar of the human experience, and any admission to hospital can be a traumatic experience. This is certainly the case for children and adolescents. Their perspectives on this experience need to be allowed to influence healthcare facilities, policies, and processes where possible, to minimize any potential negative impacts, and to maximize the capacity of these contexts to support children's well-being (Bishop K, 2014). Therefore, based on developmental psychology, research can provide insight into how children of different ages perceive and respond to visual stimuli. Understanding children's developmental stages can help create age-appropriate hospital visual identity environments for children of different ages. Guides designers in creating a healing and welcoming environment for medical visits. Promotes a positive emotional experience for children in the hospital and reduces stress and anxiety for pediatric patients.

METHODS

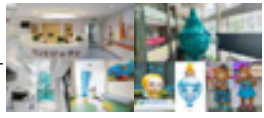
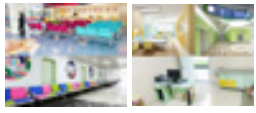
Research methods and scope

The research methods used were literature research and empirical research. The relationship between developmental psychology and visual identity in children's hospitals was defined by organizing existing information, theories and literature. Based on the relevant theories, a research study system was established: Visual identity such as colors, fonts, graphics, and patterns in Hangzhou Children's Hospital was compiled and analyzed, and a questionnaire survey and empirical analysis of pediatric patients and their guardians aged 6-14 were conducted. The results were quantitatively analyzed using SPSS software and model analysis. Feedback from children of different age groups on Visual Identity was analyzed using comparative and cross-tabulation analysis, and finally summarized to draw conclusions.

Figure 1. Overall Visual Identity of Hangzhou Children's Hospital

Scope of study: Visual identity, such as color design, font design, graphic design, and pattern design, as they appear in different areas of the environment of Hangzhou Children's Hospital.

Table 1. Hangzhou Children's Hospital Visual Identity Category
[Note. Photo taken at Hangzhou Children's Hospital]

Visual Identity Elements	Sub-elements	HangZhou Children's Hospital
Shapes	Round and curved shape	
	Triangles and squares	
Patterns	Nature Theme	
	Cartoon character theme	
Colors	Highly saturation color	
	Low saturation color	
	White	
Fonts	Sans Serif	
	Funny fonts	

Research framework

Based on the study of children's hospital visual identity under developmental psychology, firstly, the visual identity of children's hospitals was classified based on the integration of related theories, which were graphic design, pattern design, color design, and font design. Secondly, the psychological feedback of children and parents in the process of medical treatment was studied, and two dimensions were conceived based on the existing research results: Design Uniformity Dimension and Design Suitability Dimension. The overall feedback of children and guardians on the visual environment of hospitals during medical

visits and the psychological impact of different visual identities on children were explored respectively.

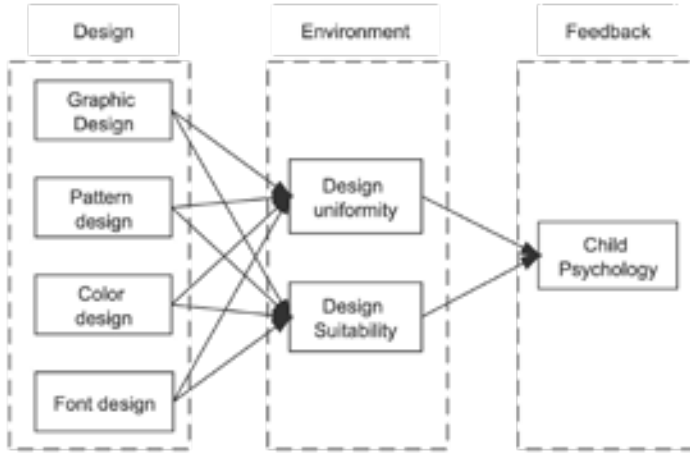


Figure 2. Research Framework

EMPIRICAL ANALYSIS

Characteristics of the study population

After determining the research framework and study population, a questionnaire was developed based on the research hypotheses, and questionnaire data were measured using the Likert scale, which ranges from 0-5: Strongly Agree – Strongly Disagree. A total of 505 children and guardians attending Hangzhou Children's Hospital participated in the study. The questionnaire was published in May 2023 and shared by the researcher at Hangzhou Children's Hospital, China, and children participated in this questionnaire with the assistance of their guardians. After removing the unreliable and invalid questionnaires (except sample data from 23 children with vision-related diseases and those with intellectual development deficits, 80 children under 6 years of age, and 1 child with no medical experience, 1 sample with no medical experience), a total of 400 valid data were obtained. A total of 196 boys, 204 girls, 247 children aged 6-8 , 134 children aged 9-11 , and 19 children aged 12-14 . 61.8% of the children reported feeling comfortable during their visit to Hangzhou Hospital. 38.2% reported being neutral or uncomfortable.

Table 2. Analysis of the characteristics of the research subjects

	Variables	Number	Percentage
Gender	Male(M)	196	49%
	Female(F)	204	51%
Age	6-8	247	63.7%
	9-11	134	33.5%
	12-14	19	4.7%
comfortable visit at Children's Hospital	Strongly disagree	24	6%
	Disagree	44	11%
	Neither agree nor disagree	85	21.2%
	Agree	152	38%
	Strongly Agree	95	23.8%

Reliability and validity of the questionnaire

Table 3. Table of reliability and validity test results

	Dimensional division	Variable measurement	Cronbach's Alpha	Factor loading
Children Psychology	Design uniformity	High degree of overall visual convenience of the hospital	0.899	0.879
		High degree of overall aesthetics of the hospital		0.860
		High degree of uniformity in hospital design		0.878
	Design Suitability: Graphical design	Easily attracted by the graphic design that appears in the hospital	0.862	0.896
		The circular and curved designs that appear in hospitals are very comfortable		0.863
		The square and triangular designs that appear in hospitals are very comfortable		0.893
	Design Suitability: Pattern design	Easily attracted by the pattern design that appears in the hospital	0.865	0.870
		The nature-themed pattern design of the hospital is very comfortable		0.873
		The design of cartoon characters in hospitals is very comfortable		0.885
	Design Suitability: Color design	Easily attracted by the color design that appears in the hospital	0.941	0.871
		The High-saturation color design of the hospital is very comfortable		0.886
		The low-saturation color design of the hospital is very comfortable		0.884
		The white color of the hospital is very comfortable		0.866
	Design Suitability: Font Design	Easily attracted by the font design that appears in the hospital	0.858	0.873
		The hospital's (sans serif) font is very comfortable		0.865
		The hospital's (personalized cute font) font is very comfortable		0.882

SPSS 24.0 software was used to analyze the reliability and validity of the 400 data collected. As can be seen from Table 3, the reliability coefficient values were all above 0.8, indicating the high quality of the reliability of the study data. The reliability coefficient values of the study data are above 0.8, which collectively indicates that the data are of high reliability quality and can be used for further analysis. The validity was verified using KMO and Bartlett's test, and from the graphs, it can be seen that the factor loading values are all greater than 0.8, and the study data are well suited for extracting information for analysis (a side reaction to good validity). The questionnaire structure and data results are highly reliable and valid and meet the criteria for research adoption, so further empirical analysis and research can be carried out.

Uniformity analysis of Hang Zhou children's hospital Visual Identity

Based on the questionnaire in Table 3, the three components of hospital visual identity uniformity were explored separately: overall aesthetics, overall convenience, and overall uniformity. Table 4 collates feedback from children of different genders and ages on the overall visual unity of the hospital. A total of 245 children, or 61.25%, agreed that the hospital's visual identity was highly uniform. Boys aged 6-8 agreed the most, 68.75%. Girls aged 12-14 agreed the least, 20%. The older the age, the lower the percentage of recognition.

Table 4. High degree of uniformity in hospital design
[Note. The "number" in the table refers to the number of children who participated in the questionnaire.]

Gender	Age	Number					Percentage
		Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	
Male	6-8	9	12	15	43	33	68.75%
	9-11	9	8	18	21	19	53.33%
	12-14	2	3	2	2	0	22.22%
Female	6-8	7	16	24	60	28	65.2%
	9-11	2	9	12	14	22	61.02%
	12-14	4	2	2	1	1	20%

Table 5 collates feedback from children of different genders and ages on the overall visual convenience of the hospital. A total of 246 children, or 61.5%, agreed that the visual identity of the hospital was highly accessible. Boys aged 6-8 were the most likely to agree, at 68.75%. Girls aged 12-14 were the least likely to agree. The older the age, the lower the percentage of recognition.

Table 5. High degree of overall visual convenience of the hospital
[Note. The "number" in the table refers to the number of children who participated in the questionnaire.]

Gender	Age	Number					Percentage
		Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	
Male	6-8	11	4	20	44	33	68.75%
	9-11	9	10	19	16	21	49.33%
	12-14	1	4	2	2	0	22.22%
Female	6-8	10	2	32	52	39	67.4%
	9-11	2	8	12	18	19	62.71%
	12-14	3	4	1	2	0	20%

Table 6 collates feedback from children of different genders and ages on the overall visual aesthetics of the hospital. A total of 246 children (61.5%) agreed that the visual identity of the hospital was highly aesthetic, with girls aged 6-8 agreeing the most (65.92%) and boys aged 12-14 agreeing the least (33.33%). The older the age, the lower the percentage of recognition. The overall recognition of girls is higher than that of boys.

Table 6. High degree of overall aesthetics of the hospital
[Note. The "number" in the table refers to the number of children who participated in the questionnaire.]

Gender	Age	Number					Percentage
		Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	
Male	6-8	9	10	21	47	25	64.28%
	9-11	7	12	15	21	20	54.67%
	12-14	3	2	1	1	2	33.33%
Female	6-8	13	12	21	55	34	65.92%
	9-11	5	7	11	16	20	61.02%
	12-14	2	2	1	2	3	50%

Comparing and analyzing the three sets of data, the total percentage of overall visual uniformity recognition is 61.25%, and the total percentage of overall visual convenience and aesthetic recognition are both 61.5%. Recognition data is over 50%, and children attending the hospital have a relatively high degree of recognition for the uniformity of the hospital's visual identity. The overall visual aesthetics of the hospital received the highest percentage of approval. The lowest percentage of recognition for overall hospital visual uniformity. The aesthetic of Hangzhou Children's Hospital's visual identity is recognized by

most children attending the hospital. However, there are some shortcomings in the overall uniformity of the visual. Hangzhou Children's Hospital needs to further improve the overall visual unity and convenience.

Suitability Analysis of Hang Zhou children's hospital Visual Identity

Based on the questionnaire in Table 3, the applicability of the visual identity of Hangzhou Children's Hospital was studied. Separately, the questionnaire was conducted to investigate the applicability of graphic design, pattern design, color design and font design in children's hospital. An attempt was made to explore the visual design that most attracts children's attention.

Table 7 provides feedback on the applicability of hospital graphic design to children of different genders and ages. Look at data from different age groups. Children aged 6-11 were more likely to be attracted to hospital graphic design. Girls aged 6-8 agreed the most and boys aged 12-14 the least. Observe the different gender data. Girls were more likely to be attracted to hospital graphic design than boys.

Table 7. Easily attracted by the graphic design that appears in the hospital
[Note. The "number" in the table refers to the number of children who participated in the questionnaire.]

Gender	Age	Number					Percentage
		Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	
Male	6-8	6	8	24	40	34	66.07%
	9-11	2	16	18	17	22	52%
	12-14	4	4	0	0	1	11.11%
Female	6-8	8	13	19	62	33	70.37%
	9-11	4	10	10	19	16	59.32%
	12-14	3	1	2	2	2	40%

Table 8 provides feedback on the suitability of hospital graphic design for children of different genders and ages. Look at data for different age groups. Children aged 6-11 were more likely to be attracted to hospital graphic design. Boys aged 6-8 expressed the most agreement and boys aged 12-14 expressed the least agreement. Look at different gender data. Girls were similarly more attracted to hospital graphic design than boys.

Table 8. Easily attracted by the pattern design that appears in the hospital [Note. The "number" in the table refers to the number of children who participated in the questionnaire.]

Gender	Age	Number					Percentage
		Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	
Male	6-8	7	7	24	44	30	66.07%
	9-11	8	4	19	25	19	58.67%
	12-14	1	5	2	1	0	11.11%
Female	6-8	11	12	24	51	37	65.18%
	9-11	10	5	9	15	20	59.32%
	12-14	2	2	2	1	3	40%

Table 9 collates feedback on the suitability of hospital color design for children of different genders and ages. Look at data from different age groups. Children aged 6-11 were more likely to be attracted to hospital color design. Girls aged 6-8 agreed the most and boys aged 12-14 the least. Observe the different gender data. Overall feedback for girls was over or equal to 50%, and girls were more likely to be attracted to the hospital's color scheme than boys.

Table 9. Easily attracted by the color design that appears in the hospital [Note. The "number" in the table refers to the number of children who participated in the questionnaire.]

Gender	Age	Number					Percentage
		Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	
Male	6-8	6	9	20	43	34	68.75%
	9-11	2	17	13	20	23	57.33%
	12-14	3	2	1	1	2	33.33%
Female	6-8	4	12	25	55	39	69.63%
	9-11	5	4	12	14	24	64.4%
	12-14	3	0	2	2	3	50%

Table 10 collates feedback on the suitability of hospital font design for children of different genders and ages. Look at data for different age groups. Children aged 6-11 were more likely to be attracted to hospital typography. Girls aged 6-8 agreed the most and boys aged 12-14 the least. Look at different gender data. Girls were similarly more likely to be attracted to hospital graphic design than boys, but there was little difference in the overall data.

Table 10. Easily attracted by the font design that appears in the hospital [Note. The "number" in the table refers to the number of children who participated in the questionnaire.]

Gender	Age	Number					Percentage
		Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	
Male	6-8	8	17	18	36	33	61.61%
	9-11	6	11	23	19	16	46.67%
	12-14	3	4	0	2	0	22.22%
Female	6-8	5	14	28	65	23	65.18%
	9-11	6	6	13	10	24	57.63%
	12-14	2	3	2	2	1	30%

Comparing and analyzing the four data sets, the total share of graphic design recognition is 62%. The overall percentage of graphic design recognition is 61.5%. The total percentage of color design approvals is 65%. 57.7% for font design. The recognition data is over 50%, and the overall recognition of children's applicability to the hospital's visual identity is relatively good. Children's approval of hospital visual color design was highest, and hospital visual graphic design was second highest. The graphic design of hospital visuals was the third most recognized. The recognition of hospital visual font design is lowest. Preliminary analysis: The color design of the visual identity of Hangzhou Children's Hospital is most likely to attract children's attention, followed by pattern and graphic design. Hospital visual font design is the least likely to attract children's attention.

Hang Zhou Children's hospital graphic design suitability

Based on the questionnaire content in Table 3, the comfort of graphic design in Hangzhou Children's Hospital was discussed in detail. Children's feedback on different graphic designs was investigated. Table 11 shows feedback from children of different genders and ages on the design of circular curvilinear. The overall approval rate for boys was 60.71% and the overall approval of the girls age group was 66.17%. Both boys and girls aged 6-8 had the highest approval levels and boys aged 12-14 had the lowest approval levels.

Table 11. The circular and curved designs that appear in hospitals are very comfortable [Note. The "number" in the table refers to the number of children who participated in the questionnaire.]

Gender	Age	Number					Percentage
		Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	
Male	6-8	9	6	20	43	34	68.75%
	9-11	6	12	17	23	17	53.33%
	12-14	1	4	2	2	0	22.22%
Female	6-8	10	9	23	51	42	68.89%
	9-11	4	6	11	16	22	64.41%
	12-14	4	0	2	2	2	40%

Table 12 shows feedback data on the square triangle design for children of different genders and ages. The overall approval rate for the boys' age group is 58.67% and for the girls' age group is 65.2%. Boys aged 6-8 and 12-14 have a higher approval rate than girls, while boys aged 9-11 have a lower approval rate than girls.

Table 12. The square and triangular designs that appear in hospitals are very comfortable [Note. The "number" in the table refers to the number of children who participated in the questionnaire.]

Gender	Age	Number					Percentage
		Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	
Male	6-8	5	9	22	40	36	67.86%
	9-11	5	15	20	25	10	46.67%
	12-14	0	4	1	4	0	44.44%
Female	6-8	3	7	34	61	30	67.41%
	9-11	2	5	14	18	20	64.41%
	12-14	2	3	1	1	3	40%

Compare and analyze the two sets of data. Children recognized the graphic design of rounded curved shapes more generally. Children aged 6-11 recognized rounded curved shapes more. Aged 12-14 recognized square triangles more. Overall, age group endorsement was higher for girls than boys.

Hang Zhou Children's hospital pattern design suitability

According to the questionnaire in Table 3, a detailed survey of pattern design in Hangzhou Children's Hospital was conducted. Feedback on children's comfort with different styles of pattern design was investigated. Table 13 shows

feedback from children of different genders and ages on nature themed design. Boys' overall approval was 62.24%. The overall approval rate for girls is 53.92%. Boys' overall approval of nature-themed design is higher than that of girls. Among them, boys aged 6-8 have the highest level of recognition, while girls aged 12-14 have the lowest level of recognition.

Table 13. The nature-themed pattern design of the hospital is very comfortable
[Note. The "number" in the table refers to the number of children who participated in the questionnaire.]

Gender	Age	Number					Percentage
		Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	
Male	6-8	4	7	20	46	35	72.32%
	9-11	8	13	15	20	19	52%
	12-14	3	3	1	1	1	44.44%
Female	6-8	11	19	30	48	27	55.56%
	9-11	9	9	8	12	21	55.93%
	12-14	2	2	4	0	2	20%

Table 14 shows feedback from children of different genders and ages on the design of cartoon character designs. Boys' overall approval is 57.14%. The overall approval rate for girls is 60.78%. Overall recognition of cartoon character design is higher for girls than boys. Among them, boys aged 6-8 have the highest level of approval, and boys aged 12-14 have the lowest level of approval.

Table 14. The design of cartoon characters in hospitals is very comfortable
[Note. The "number" in the table refers to the number of children who participated in the questionnaire.]

Gender	Age	Number					Percentage
		Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	
Male	6-8	10	9	17	47	29	67.86%
	9-11	5	14	21	16	19	46.67%
	12-14	1	6	1	1	0	11.11%
Female	6-8	7	14	31	50	33	61.48%
	9-11	4	7	12	16	20	61.02%
	12-14	3	1	1	3	2	50%

Comparative analysis of the two data sets. Children aged 6-8 are more likely to approve of nature themes. Aged 9-11 are more likely to approve of cartoon images. Aged 12-14 are more likely to approve of nature themes. Children's

overall recognition of cartoon character design is higher. Boys had higher overall approval of nature theme designs and girls had higher overall approval of cartoon character designs.

Hang Zhou Children's hospital color design suitability

Based on the questionnaire in Table 3, a detailed survey of the color design of Hangzhou Children's Hospital was conducted. Feedback on children's comfort with different color designs was investigated. Table 15 shows feedback from children of different genders and ages on the high saturation design. Boys overall approval was 60.71%. Girls' overall approval was 59.8%. Boys' overall approval of high saturation color design is higher than that of girls. Boys aged 6-8 had the highest level of approval and boys aged 12-14 had the lowest.

Table 15. The High-saturation color design of the hospital is very comfortable [Note. The "number" in the table refers to the number of children who participated in the questionnaire.]

Gender	Age	Number					Percentage
		Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	
Male	6-8	6	13	18	41	34	66.96%
	9-11	7	10	16	21	21	56%
	12-14	2	4	1	2	0	22.22%
Female	6-8	5	8	37	55	30	62.96%
	9-11	4	8	13	11	23	57.63%
	12-14	4	1	2	1	2	30%

Table 16 shows feedback from children of different genders and ages on low-saturation design. Boys' overall approval is 61.22%. Girls' overall approval is 62.25%. Girls' overall approval of low-saturation color designs is higher than boys' approval. Boys aged 6-8 had the highest level of approval and boys aged 12-14 had the lowest.

Table 17 presents data on white color feedback from children of different genders and ages. Boys' overall approval is 58.16%. Girls' overall approval is 61.27%. Overall recognition of white color is higher for girls than boys. Girls aged 9-11 have the highest approval rating, while boys aged 12-14 have the lowest.

Comparative analysis of the three datasets. Children aged 6-8 had the highest approval of low saturation colors. Aged 9-11 had the highest approval of

whites. Aged 12-14 had the highest approval of low saturation. Children had the highest overall approval of low saturation color designs and the lowest approval of white. Boys had a higher overall approval rating for highly saturated color designs, and girls had a higher overall approval rating for low saturated colors and white designs.

Table 16. The low-saturation color design of the hospital is very comfortable
[Note. The "number" in the table refers to the number of children who participated in the questionnaire.]

Gender	Age	Number					Percentage
		Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	
Male	6-8	5	10	18	43	36	70.53%
	9-11	5	15	16	17	22	52%
	12-14	2	4	1	1	1	22.22%
Female	6-8	9	15	24	50	37	64.44%
	9-11	7	8	9	15	20	59.32%
	12-14	2	1	2	3	2	50%

Table 17. The white color of the hospital is very comfortable
[Note. The "number" in the table refers to the number of children who participated in the questionnaire.]

Gender	Age	Number					Percentage
		Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	
Male	6-8	7	11	20	49	25	66.07%
	9-11	4	11	21	20	19	52%
	12-14	2	4	2	1	0	11.11%
Female	6-8	7	14	31	52	31	61.48%
	9-11	4	10	6	13	26	66.1%
	12-14	3	3	1	1	2	30%

Hang Zhou Children's hospital font design suitability

Based on the questionnaire content in Table 3, a detailed survey was conducted on the font design of Hangzhou Children's Hospital. Feedback on children's comfort levels with different font designs was investigated. Table 18 shows feedback data on sans serif fonts for children of different genders and ages. The overall approval rating for boys was 59.18%. The overall approval rating of sans serif fonts for girls was 65.69%. Overall approval of sans serif fonts was higher for girls than for boys. Boys aged 6-8 had the highest approval of

sans serif fonts, while boys aged 12-14 had the lowest approval.

Table 18. The hospital's (sans serif) font is very comfortable
[Note. The "number" in the table refers to the number of children who participated in the questionnaire.]

Gender	Age	Number					Percentage
		Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	
Male	6-8	10	8	17	43	34	68.75%
	9-11	8	16	15	18	18	48%
	12-14	3	3	0	2	1	33.33%
Female	6-8	10	13	21	60	31	67.4%
	9-11	5	5	10	17	22	66.1%
	12-14	0	3	3	1	3	40%

Table 19 shows feedback on personalized cute fonts from children of different genders and ages. The overall approval rate for boys was 59.69%. The overall approval rating for girls is 65.69%. Overall approval of personalized cute fonts is higher among girls than boys. Girls aged 6-8 have the highest approval, while boys aged 12-14 have the lowest approval.

Table 19. The hospital's (personalized cute font) font is very comfortable
[Note. The "number" in the table refers to the number of children who participated in the questionnaire.]

Gender	Age	Number					Percentage
		Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	
Male	6-8	8	7	23	42	32	66.07%
	9-11	5	12	17	26	15	54.67%
	12-14	3	2	2	2	0	22.22%
Female	6-8	8	12	24	57	34	67.4%
	9-11	4	7	9	13	26	66.1%
	12-14	4	1	1	1	3	40%

Comparative analysis of the two data sets. Children aged 6-8 were more likely to approve of sans serif fonts. Aged 9-11 were more likely to approve of personalized cute fonts. Aged 12-14 were more likely to approve of sans serif fonts. Children are more likely to approve of Personalized Cute Fonts overall. Boys have a higher overall approval rating for Personalized Cute Fonts, and girls have about the same approval rating for both font designs.

CONCLUSION

As a pediatric healthcare institution, Hangzhou Children's Hospital must continuously prioritize the medical experience and feedback of its young patients. Through data analysis presented in the empirical analysis section, a better visual identification method for the hospital has been developed, with the aim of providing valuable research experience for other children's hospitals. The following key points summarize this development:

1. The overall visual aesthetics of the hospital should be improved while maintaining convenience and unity in the overall visual design.

2. The hospital's visual identity should prioritize color, followed by graphic design, pattern design, and text design.

3. Graphic design should feature rounded, curved shapes that align with children's recognition patterns.

4. Pattern design should consider the age of the child; natural theme patterns are preferred by children aged 6-11, while cartoon characters are preferred by those aged 12-14. Natural theme designs should be prioritized, with cartoon character designs used as a supporting element.

5. Color design should utilize a low saturation color system that is more suitable for children. Boys tend to have higher overall recognition of high saturation color designs, while girls favor low saturation colors and white designs.

6. Sans serif font design is more suitable for children, although it may not be universally applicable. Recognition of font design by guardians or adults should also be considered.

I believe that the study lacks comprehensiveness, and thus there is a need for researchers to conduct empirical analyses on more hospitals, taking into account the differences in various regions, countries, and cultures. With continuous advancements in medical technology and related research in developmental psychology, it is crucial for designers and researchers to remain vigilant of hospital environments. Specifically, the impact of visual design on children's psychological wellbeing should always be given careful consideration. By creating a healing and comfortable medical environment, positive emotional experiences can be promoted for children who require hospital care.

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