

COLOR APPLICATION FOR HEALTHCARE ENVIRONMENTS

Interior Color for Pediatric Patient Room Design

Objective:

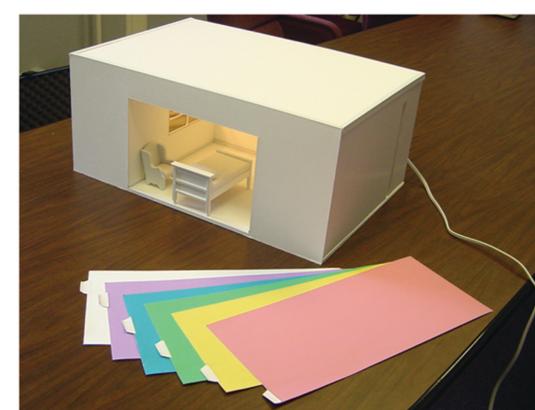
The purpose of this study was to investigate the value of color as a component of a healing environment for pediatric patient rooms. Color preferences from pediatric inpatient, pediatric outpatient, and healthy children groups were investigated and compared for group and gender differences.

Background:

Positive environmental stimulation can promote patient well-being by reducing stress or negative feelings. If environmental colors can have positive influences, then those colors will make patients more comfortable, reducing their stress. Although previous color studies are suggestive, none has focused on pediatric healthcare environments. Patients' health status may affect their reaction to environmental stimulation. There was a gap in the body of knowledge regarding the consistency of color preferences with regard to patient health status.

Methods:

A simulation method was used because of its reliability and feasibility. It allowed for investigating the value of color in real contexts and controlling confounding variables. Previous color preference studies typically have been done with small colored squares of paper, which are visually different from seeing a color applied on wall surfaces. In addition, they failed to control confounding variables such as color attributes and light sources.

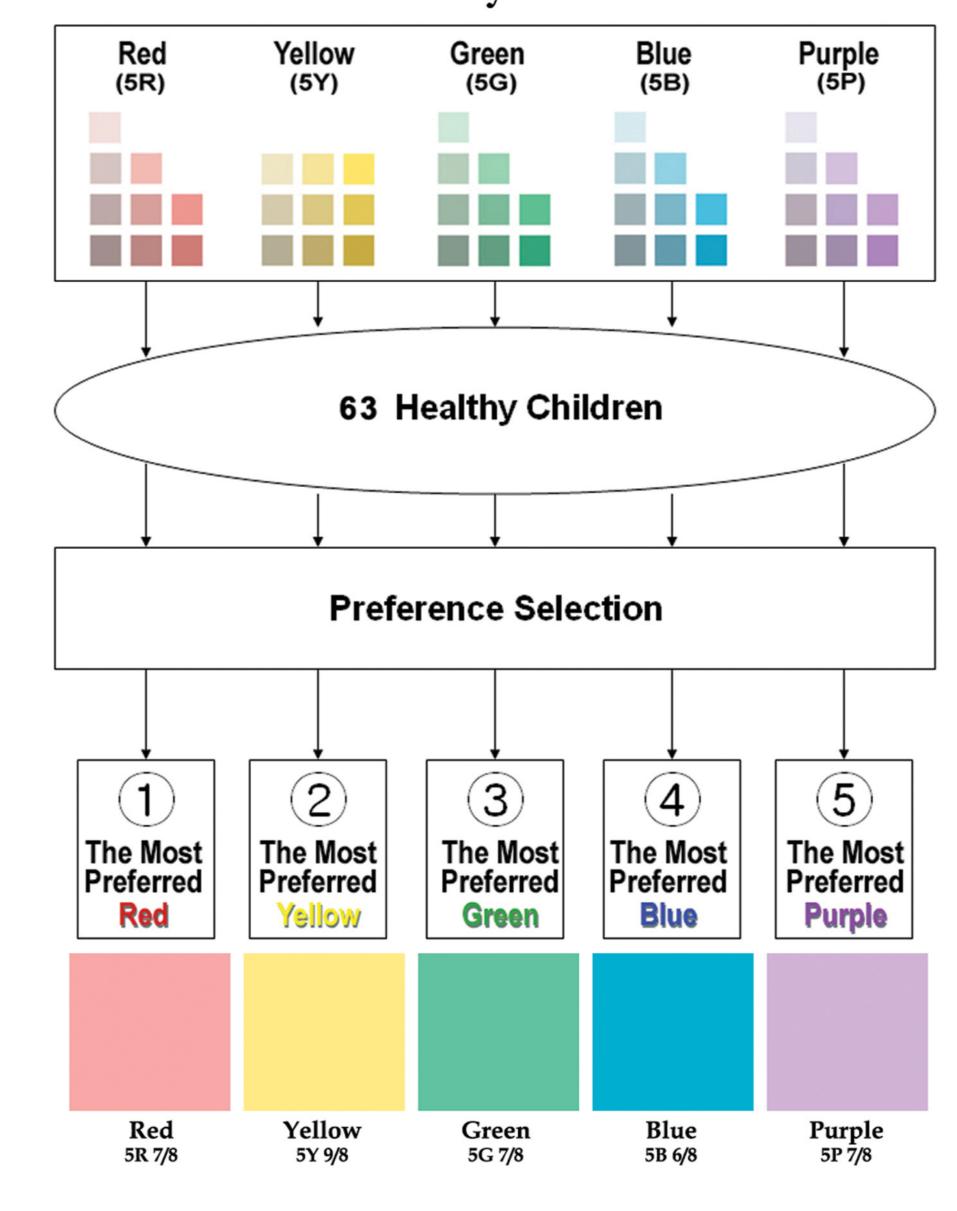




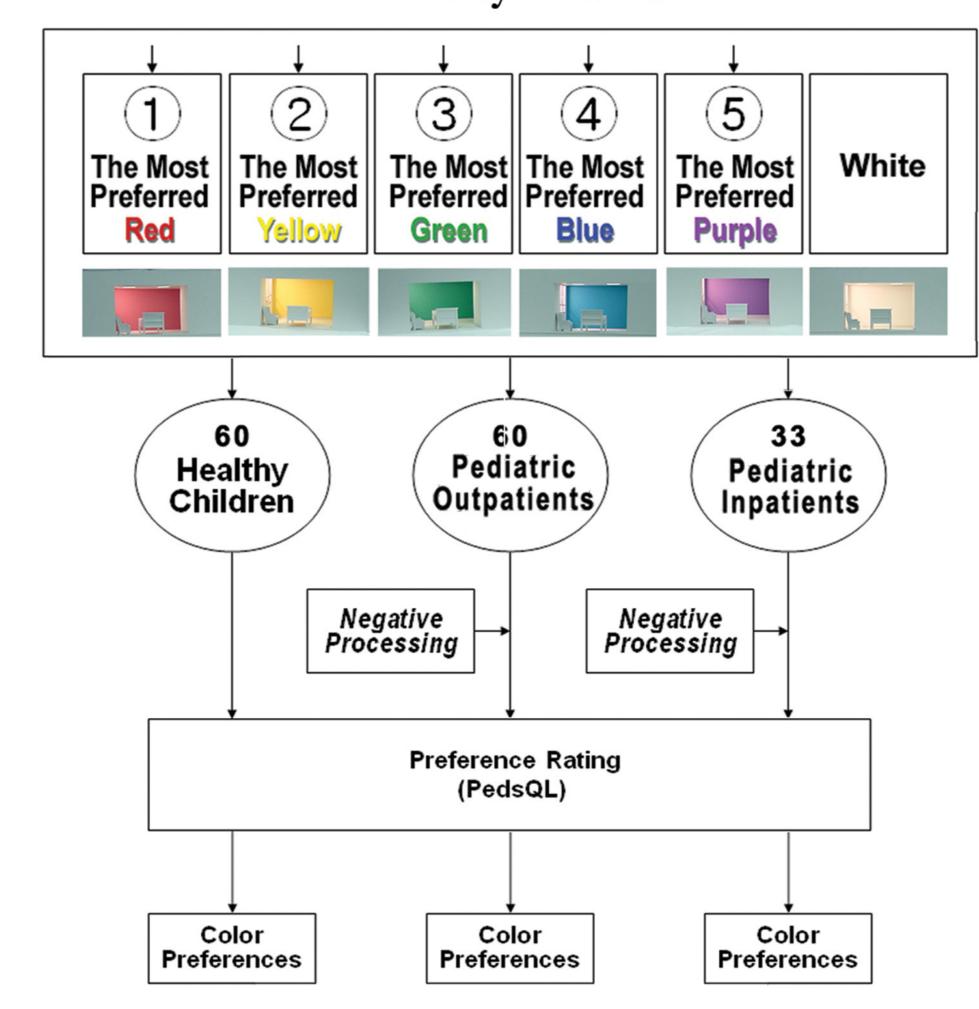
Pilot Study & Main Study:

This study consisted of two phases: a pilot study and a main study. The pilot study investigated healthy children's most preferred colors from each of the five hue families defined by the Munsell color system. Using the most preferred colors yeilded by the pilot study, the main study measured color preferences from pediatric inpatients and pediatric outpatients, and then compared them to those of healthy children in order to investigate group and gender differences.

Pilot Study Structure:



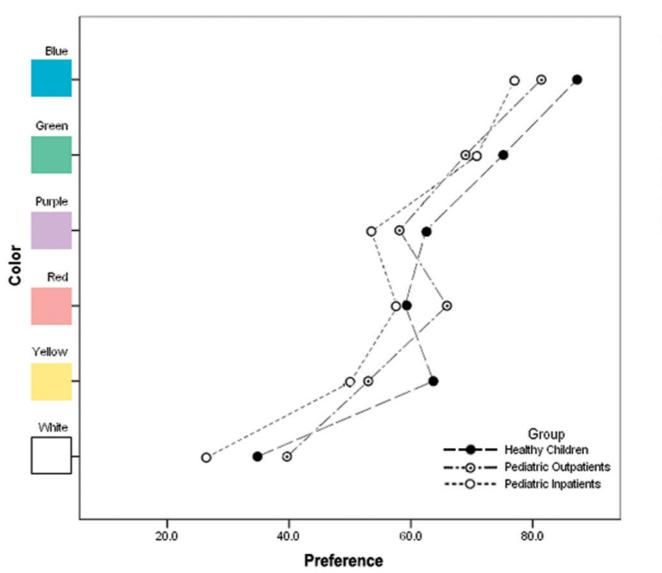
Main Study Structure:



Results:

Group Differences

Group differences were not significant. This refuted the hypothesis that the color preferences of pediatric patients are different from those of healthy children.



color preferences. Subjects were divided into three groups: healthy children (7–11 years, N=60), pediatric outpatients (7–11 years, N=60), and pediatric inpatients (7–11 years, N=33). Figure 1 displays the means for each group's color preferences. Mauchly's test of sphericity indicated that the assumption of sphericity had been violated (χ^2 (14) = 52.25, p=.000); therefore degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity ($\epsilon=.88$). Table 5 presents tests of interactions between color and group. The results showed that the interaction between group and color preference was not significant, F (8.83, 661.92) = .92, p=.508.

A 3 (Group) x 6 (Color preference) mixed-model ANOVA revealed that the main effect of the between-subjects variable (Group) was not significant, F (2, 150) = 2.04, p=.134 (see Table 2). To summarize, there was no statistically significant difference between healthy children and pediatric patient groups in terms of color preferences. The mean differences were relatively small and all the groups showed similar color preference patterns except for yellow; interestingly, pediatric patients, both outpatients and inpatients, had a less pronounced preference for yellow than the healthy children.

A mixed between-within subjects ANOVA was conducted to investigate group differences in

 Table 1. Color and Group Interactions

 Source
 Type III Sum of Squares
 df
 Mean Square
 F
 Sig.
 Partial Eta Squared

 Color * Group
 Sphericity Assumed
 8492.352
 10
 849.235
 .918
 .516
 .012

 Greenhouse-Geisser
 8492.352
 8.826
 962.244
 .918
 .508
 .012

 Huynh-Feldt
 8492.352
 9.247
 918.345
 .918
 .511
 .012

 Lower-bound
 8492.352
 2.000
 4246.176
 .918
 .402
 .012

 Error(Color)
 Sphericity Assumed
 694141.515
 750
 925.522

 Greenhouse-Geisser
 694141.515
 661.917
 1048.683

 Huynh-Feldt
 694141.515
 693.559
 1000.839

 Lower-bound
 694141.515
 150.000
 4627.610

Gender Differences

Figure 1. Means of Color Preferences by Groups

Gender effects indicated that girls preferred red and purple more than boys do.

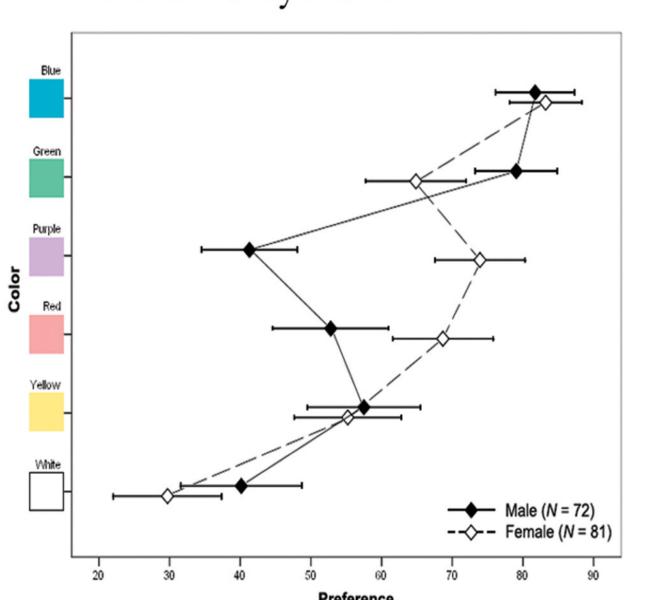


Figure 2. Overall Means and Confidence Intervals by Gender

A mixed between-within subjects ANOVA was conducted to investigate gender differences. All children groups were combined together and divided into males (N = 72) and females (N = 81). The means and confidence intervals by gender are presented in Figure 2. Mauchly's test of sphericity indicated that the assumption of sphericity had been violated (χ^2 (14) = 43.04, p = .000); therefore degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity ($\varepsilon = .90$). The results showed that the interaction between gender and color preference was significant, F (4.51, 680.20) = 13.82, p = .000 (see Table 3).

Color * Gender Sphericity Assumed 58912.258 5 11782.452 13.819 .000 .084
Greenhouse-Geisser 58912.258 4.505 13078.122 13.819 .000 .084
Huynh-Feldt 58912.258 4.691 12558.562 13.819 .000 .084
Lower-bound 58912.258 1.000 58912.258 13.819 .000 .084

Error(Color) Sphericity Assumed 643721.609 755 852.611
Greenhouse-Geisser 643721.609 680.201 946.370
Huynh-Feldt 643721.609 708.342 908.773
Lower-bound 643721.609 151.000 4263.057

To break down this interaction, contrasts were performed comparing color preferences across males and females. The results revealed that the increased preference found among females was significantly higher than for males in red, F(1, 151) = 13.06, p = .000; and purple, F(1, 151) = 13.06, p = .000; and purple, F(1, 151) = 13.06, p = .000; and purple, p = .000 (see Table 4). An inspection of means and confidence intervals indicated that males reported lower preference scores on red and purple than did females.

 Source
 (vs. White)
 of Squares
 df
 Mean Square
 F
 Sig.
 Squared

 Color * Gender
 Red
 26386.020
 1
 26386.020
 13.063
 .000
 .080

 Yellow
 2537.434
 1
 2537.434
 1.068
 .303
 .007

 Green
 541.337
 1
 541.337
 .253
 .616
 .002

 Blue
 5418.580
 1
 5418.580
 3.560
 .061
 .023

 Purple
 70666.830
 1
 70666.830
 36.880
 .000
 .196

 Error(Color)
 Red
 304999.208
 151
 2019.862
 Yellow
 358882.566
 151
 2376.706
 Secondary States
 Sec

Conclusions:

All three groups showed similar color preference patterns, except for yellow. Both pediatric outpatients and inpatients preferred yellow less than healthy children did. Healthy children's mean scores of color preferences were higher than the pediatric outpatients; pediatric outpatients group had higher mean scores of color preferences than pediatric inpatients group Although this observation was not statistically significant, it raised the question of whether the sickest pediatric patients respond differently to color than healthy children do.

Gender effects indicated that girls preferred red and purple more than boys do. Regardless of gender effects, healthy children and pediatric patients preferred blue and green the most and white the least.