Steps for analyzing the color-match data….

There were 96 color squares.  A click on a color square was recorded as response 1-96.   Each color square is defined by Value (lightness), Choma (saturation), and Hue.  The hues are numbered 2 (2.5 Red) through 40 (10 Red-Purple), and with 0 denoting the achromatic hues.

 Table 1 (appended) provides the Value, Chroma, and Hue values for each color square (1-96).

 We assumed that the hues 1-40 were evenly spaced in angle around the 360-degree unit color circle.  Table 2 (appended) contains the translation of hue number to the x-y coordinates on the unit color circle.  Column 1 gives the hue number, column 2 gives the corresponding angle, columns 3-4 give the x-y coordinates on the unit circle.   (The x-y coordinates of the neutral hues (0) are defined as (0,0) .)

As described in the article, for each subject, the analysis program would go through the 360 color-match trials.   It would record the rock number and color-square response associated with each trial.   The color-square response would then be converted to the corresponding Value (V), Chroma (C), and Hue numbers (H) associated with that color square, with Hue converted to x-y coordinates as described above.   (Chroma was multiplied by .1, yielding C’, for the next step below.)   The x’-y’ hue response was then computed in cylindrical coordinates using the formula

x’ =   C’\*x

y’ =  C’\*y

Computation of averaged ratings:

Finally, for each of the 360 rocks, the program computed the mean values of V, C, x’ and y’ across the 20 subjects.

Table 1. Color-Square-Number Conversions. # = color-square number, V = Munsell Value, C = Munsell Chroma, H = Munsell Hue (2.5 Red through 10 Red-Purple)

# V C H

1 8 2 2

2 6 2 2

3 4 2 2

4 2 2 2

5 7 4 2

6 5 4 2

7 3 4 2

8 6 6 2

9 4 6 2

10 2 6 2

11 8 2 4

12 6 2 4

13 4 2 4

14 2 2 4

15 7 4 4

16 5 4 4

17 3 4 4

18 6 6 4

19 4 6 4

20 7 2 6

21 5 2 6

22 3 2 6

23 2 2 6

24 8 4 6

25 6 4 6

26 4 4 6

27 3 4 6

28 5 6 6

29 8 2 8

30 6 2 8

31 4 2 8

32 2 2 8

33 7 4 8

34 5 4 8

35 8 6 8

36 6 6 8

37 7 2 10

38 5 2 10

39 3 2 10

40 8 4 10

41 6 4 10

42 4 4 10

43 7 6 10

44 5 6 10

45 8 2 12

46 6 2 12

47 4 2 12

48 7 4 12

49 5 4 12

50 6 6 12

51 7 2 14

52 5 2 14

53 3 2 14

54 7 4 14

55 7 2 16

56 5 2 16

57 3 2 16

58 6 4 16

59 4 4 16

60 7 2 18

61 5 2 18

62 3 2 18

63 7 4 18

64 6 6 18

65 5 6 18

66 8 2 20

67 6 2 20

68 4 2 20

69 7 2 22

70 5 2 22

71 3 2 22

72 6 6 22

73 4 6 22

74 8 2 26

75 6 2 26

76 7 6 26

77 5 6 26

78 7 2 30

79 5 2 30

80 3 2 30

81 6 2 34

82 4 2 34

83 2 2 34

84 8 2 38

85 6 2 38

86 4 2 38

87 2 2 38

88 1 0 0

89 2 0 0

90 3 0 0

91 4 0 0

92 5 0 0

93 6 0 0

94 7 0 0

95 8 0 0

96 9 0 0

Table 2. Hue Conversion Table. H = hue number. ϴ = angle of hue on 360-degree color circle.

x-y = coordinates of hue on the unit circle, i.e., x = cos(ϴ), y = sin(ϴ)

H ϴ x y

1 0 1.000 0.000

2 9 0.988 0.156

3 18 0.951 0.309

4 27 0.891 0.454

5 36 0.809 0.588

6 45 0.707 0.707

7 54 0.588 0.809

8 63 0.454 0.891

9 72 0.309 0.951

10 81 0.156 0.988

11 90 0.000 1.000

12 99 -0.156 0.988

13 108 -0.309 0.951

14 117 -0.454 0.891

15 126 -0.588 0.809

16 135 -0.707 0.707

17 144 -0.809 0.588

18 153 -0.891 0.454

19 162 -0.951 0.309

20 171 -0.988 0.156

21 180 -1.000 0.000

22 189 -0.988 -0.156

23 198 -0.951 -0.309

24 207 -0.891 -0.454

25 216 -0.809 -0.588

26 225 -0.707 -0.707

27 234 -0.588 -0.809

28 243 -0.454 -0.891

29 252 -0.309 -0.951

30 261 -0.156 -0.988

31 270 0.000 -1.000

32 279 0.156 -0.988

33 288 0.309 -0.951

34 297 0.454 -0.891

35 306 0.588 -0.809

36 315 0.707 -0.707

37 324 0.809 -0.588

38 333 0.891 -0.454

39 342 0.951 -0.309

40 351 0.988 -0.156