

### Instructions for training in color adjustment (Experiment 2)

At the beginning of each trial you will see a black cross in the center of the screen with a small dot in the middle. When you are ready to begin a trial, use the mouse to move the cursor (a small black circle) to the center of the cross so it covers the small dot and then click the mouse. At the start of each trial the cursor can appear anywhere on the screen.

When you click, two squares will appear in the center of the screen next to one another. The square on the right will be either white or black. This square will be the test square for the trial. The square on the left will be the target.

***Your task is to adjust the test square so that it matches the target square in color.***



Figure 1. Examples of the training trials with the test square (on the right) set to black (right) or white (left) at the beginning of the trial. The square on the left is the target, whose color is determined randomly at the beginning of each trial. The background consists of simulation of Munsell paper samples under the standard illuminant and is equivalent to that used in the experiment (illuminant-constant condition).

To adjust the color of the test square, use the joystick and red buttons on the controller (Figure 2; top).

Pressing the left or the right red button will change the intensity of the test square you are adjusting. Pressing the right red button will make the square more intense. Pressing the left red button will make the square less intense.

Moving the joystick up or down changes the hue of the square you are adjusting. This corresponds roughly to changing the dominant color of the square along a circular sequence [red, orange, yellow, green, blue, purple, and back to red], as shown in this diagram (Figure 2; bottom). Moving the joystick up will change the color in counter-clockwise direction around the circle. Moving it down will change the color in the clockwise direction around the circle.

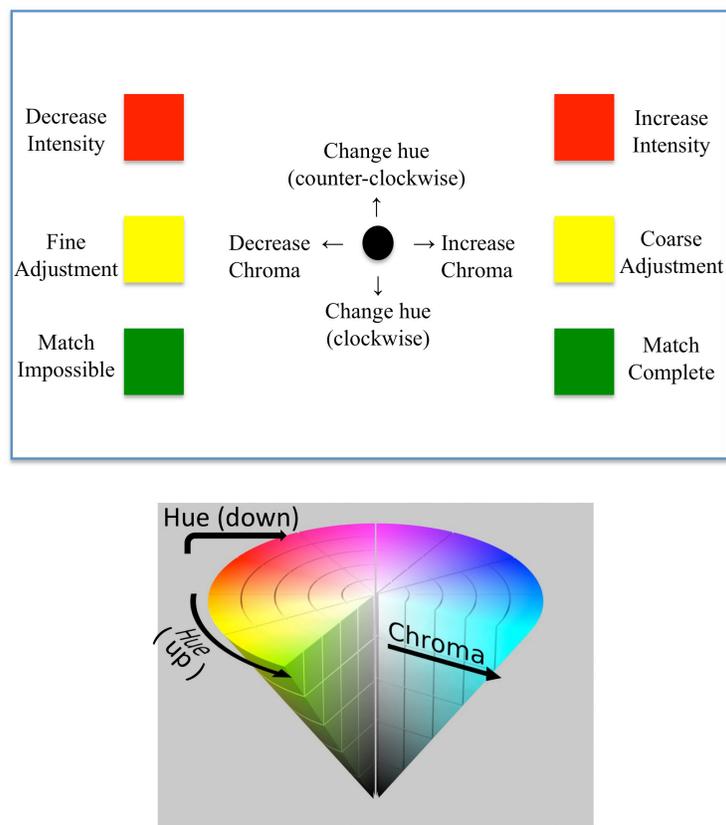


Figure 2. Top panel. Diagram of the controller used for color adjustment. Bottom panel. Direction of hue changes with each up/down movement of the joystick. Diagrams are adapted from Kanematsu & Brainard (2013).

Moving the joystick left or right will adjust the chroma, sometimes called saturation or purity, of the color square you are adjusting. You can think of this as corresponding to how much “whiteness” is mixed in with the dominant color of the square. Moving the joystick to the left will make the square less saturated (less pure). Moving it to the right will make it more saturated (more pure).

In today’s training session you will have a chance to explore how the controller works.

Initially, each movement of the joystick and each red button press has a large effect on the color of the adjusted square. As your adjustment approaches a good match, you will want to make the adjustment step size smaller. The yellow buttons allow you to control the step size. Press the left yellow button to make the step size smaller. Press the right yellow button to make it larger. There are three step sizes in all, and you should feel free to go back and forth as you proceed. As you finalize your match, however, you should use the smallest step size. Each time you press a yellow button, the program will remind you of your current step size, by saying “large”, “medium” or “small” so you can keep track of it.

Sometimes, you may reach the limits that the color can change in the direction you chose. Then you will hear a warning “Cannot change color further”. You should then try to move in the opposite direction of the one you just chose, change the step size and/or vary the remaining two dimensions to obtain your desired match.

When you are satisfied with your match, when it is as good as you can make it, press the right green button (labeled "Match Complete" in the diagram of the controller). In case you press match complete button by mistake while you are still not satisfied with your match, please let the experimenter know immediately.

In case you cannot make a satisfactory match no matter how hard you try, press the left green button (labeled “Match Impossible” in the diagram of the controller). You should try, however, to choose this option rarely – only when you feel you tried many combinations of dimensions and step sizes and none of them lead you to a satisfactory match.

Remember that at the beginning the test square will be either black or white. If it’s black, you should first try to increase its intensity and then proceed with the adjustments.

Today we will do a training session in which you will learn how to use the controller, as you practice making the adjustment on a series of trials.

***To make the test square match the target square in color match in color you will want the test and the target to blend in.***

When you think you found a good match, you can evaluate how good the match is by changing the test color by one step in “positive” and “negative” direction for each dimension at the time. This will allow final fine-tuning of your match.

In today’s session we will do two or three blocks of trials each consisting of 10 trials. During the training we will not monitor your eye movements and we will not ask you to wear the eye patch.

References:

Kanematsu, E., & Brainard, D. H. (2013). No measured effect of a familiar contextual object on color constancy. *Color Research & Application*, n/a-n/a  
<http://dx.doi.org/10.1002/col.21805>.