**Figure 1. Stimulus Examples.** The stimulus on each trial of the experiment consisted of two side-by-side checkerboards. Two checkerboards were used in each session. The checkerboards were presented for 1 second. The subject fixated a small black spot located between the stimuli (not shown), and indicated which of the two checkerboards contained the lighter probe circle. On each trial, one of the two checkerboards served as the reference; the other was the test. The probe spot in the reference checkerboard took on intensity values of 0.25, 0.50, and 0.75 (normalized intensity wrt the maximum display output). For each reference probe intensity, there were a series of test probe intensities used in the other checkerboard, chosen to bracket the reference probe intensity (method of constant stimuli). Each checkerboard served as the reference on half the trials and as the test on the other half of the trials. The left/right location of the checkerboards was randomized on each trial.

Two conditions were run. In the control condition, a 'paint' checkerboard served as both images (A). We'd expect that the point of subjective equality (pse) of the test probe for this paint-vs-paint condition would be equal to the intensity of the corresponding reference probe. In the paint-versus-shadow condition, one checkerboard was the paint checkerboard and the other was the corresponding shadow checkerboard. We expect that the pse of the test probe for this condition would be less than that of the corresponding reference probe, since at equal intensity a probe in the shadow condition appears lighter than a probe in the paint checkerboard (B).

**Figure 2. Psychometric Functions from the paint vs paint (control) condition.** The top row shows data when one of the two images was the reference, the bottom row for the other. (For this condition, these are just replications of the same thing, since the two checkerboard images are the same in this condition). Each panel is for one reference probe intensity. The x-axis shows the test probe intensity, the y-axis the fraction of times that test was chosen as being lighter. The functions increase sensibly with test probe intensity, and are fit with cumulative normals. The pse is taken as the intensity where the fit passes through 0.5; it is indicated each panel by the vertical green dash. The actual reference intensity is indicated by the vertical red dash. The horizontal green dash extends from the 0.25 to the 0.75 point in the fit, and gives a sense for the subjects discrimination threshold. The data are very regular, and the pse's lie very close to the reference probe intensities as expected. This data is for my eye, and collecting it took about 15 minutes of observing.

**Figure 3. Psychometric Functions from the paint vs shadow condition.** Same format as Figure 2. The top row shows data for the case where the paint checkerboard served as the reference, the bottom row for the case where the shadow checkerboard served as the reference. Again the data are very regular. Note, however, that the green dashes are shifted to the left of the reference intensity in the top row, and to the right in the bottom row. This is the perceptual effect of changing checkerboards. It is in the expected direction. (In the top row, a test in the shadow checkerboard that matches the lightness of a reference in the paint checkerboard has a lower intensity.)

**Figure 4. Summary of the paint vs paint condition.** This figure is derived from the data and fits shown in Figure 2. Each data point plots one reference probe intensity versus its corresponding pse. The left panel shows the data from the top row of Figure 2, the right panel shows the data from the bottom row. The sense of the data is flipped in the right panel, so that the x-axis in both panels corresponds to stimuli shown in the same image. (This will be clearer in Figure 5.) A single line was fit to the data in both panels (all 6 points). This single line is replotted in both panels, and has a slope of 1 (to two places).

**Figure 5. Summary of the paint vs shadow condition.** Summary of the data of Figure 3, in the same format as Figure 4. Here the meaning of the swap between left and right panels may be clearer. The x-axis always plots the intensity of the stimulus that was presented in the paint checkerboard, while the y-axis presents the intensity of the stimulus that was presented in the shadow checkerboard. So in the left panel, the measured pse is on the y-axis, while in the right panel the measured pse is on the x-axis. Again, a single line was fit to all six data points, and the same line is shown in both panels. The slope of the line here is 0.94, meaning that a lower intensity probe in the shadow checkerboard matches the appearance of a probe in the paint checkerboard.

**A few thoughts.** a) I'm pleased with how regular the data are, I should be able to explore a good range of conditions if I can find an undergraduate to run recruit and run subjects. b) The measured effect is pretty small for this pair of checkerboards, but I am confident it is real and reliable even with this small amount of data. I will see if I can muck with the configuration to optimize it, as we decided when we spoke. As part of setting up the experiment, I overhauled my stimulus generation software to keep better track of what parameters were used for each generated image, and can now systematically explore a number of variables. c) It's possible that the effect is better characterized as a constant shift down of a line of slope 1, rather than as a change of slope. Once the conditions are optimized I can take a look at that. d) I have my program set up so that with a few tweaks I can vary the duration and onset time of the probe separately from that of the checkerboards. That might be interesting, as we discussed.