CONTRAST SENSITIVITY

Contrast sensitivity is the ability to detect contrast, changes in brightness in a pattern. Contrast sensitivity is one measure of the quality of vision. Although it is very important for optimum visual behavior in the real world, it is not typically tested as part of a routine eye exam (perhaps because it cannot be corrected). It does, however, serve as a diagnostic sign for some health problems, and it is very useful in predicting visual performance in poor quality visual environments (such as landing an airplane in foggy conditions).

Contrast sensitivity is measured using any of the standard psychophysical techniques. Here, the method of adjustment and a forced-choice staircase version of the method of limits are used. In the method of adjustment, the observer adjusts a marker (or the stimulus itself in other versions) to the point that the sinewave grating is no longer visible (zero contrast). In the method of limits, the contrast is increased or decreased until the observer’s response changes.

This experiment allows you to test your contrast sensitivity for four different spatial frequencies. Previous research clearly indicates that contrast sensitivity varies with spatial frequency. Very high spatial frequencies and very low spatial frequencies are usually associated with lower contrast sensitivity than mid-range values. Determine your contrast sensitivity as a function of spatial frequency using both the method of adjustment and the method of limits. Be sure to read the instructions and do some practice trials.

RESULTS & DISCUSSION

1. Present your data from each psychophysical method. Compare the two contrast sensitivity functions. Can you explain why any differences occurred?

2. Did your contrast sensitivity vary with spatial frequency? Which spatial frequencies have the highest contrast thresholds?

3. Some middle-aged people find they can read small print when they have good lighting, but that they need reading glasses if the light level is low. How might this be explained?

Assignment must include a signed statement verifying that you did the work alone.