Spatial summation breaks down when the target is above about 6 min arc diameter for the fovea, above about 0.5 degree at 5 degrees from the fovea, and above about 2 degrees at 35 degrees from the fovea.

Given that the size of the target is above the critical size, the detection of the presence of a spot of light is determined simply by the luminance contrast. For the luminance of the surround in the photopic range, there is a constant relationship between the luminance difference of the target and the background and the background luminance known as Weber's Law. This relationship takes the form

$$(L_t - L_b) / L_b = k$$

where: L_t = luminance of the target
L_b = luminance of the background
k = constant

A more general picture of the effect of adaptation luminance on threshold contrast for targets of different size is shown in Figure 2.10. The increase in threshold contrast as adaptation luminance decreases is obvious, as is the increase in threshold contrast with decreasing target size. These data were obtained using a disc of different sizes presented for 1 second in the fovea. Decreasing the presentation time and moving the target away from the fovea increases the threshold contrast, for all sizes, particularly at lower adaptation luminances.

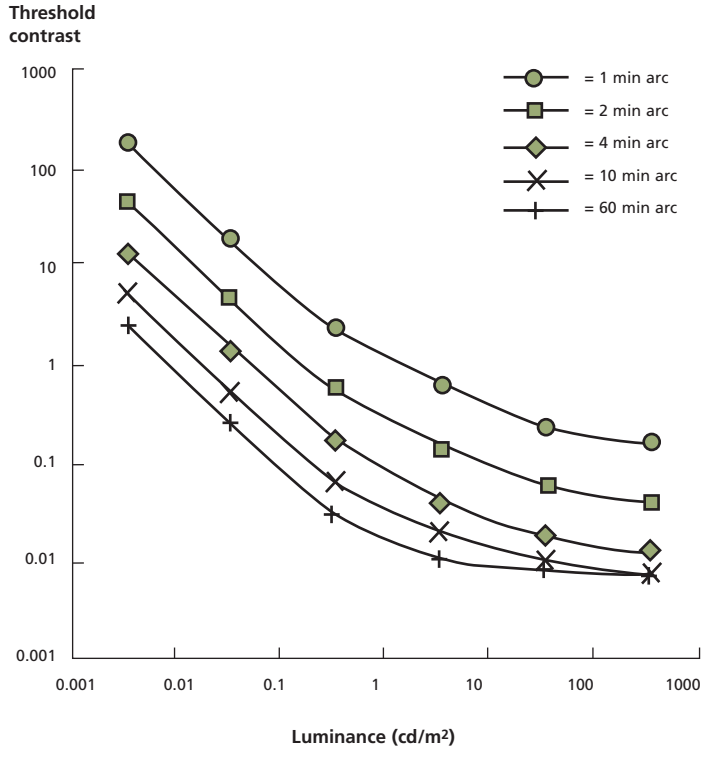

Figure 2.10 Threshold contrast plotted against background luminance for disc targets of various diameters, viewed foveally. The discs were presented for 1 second (after Blackwell, 1959).