Psychophysical scaling of circle size with and without depth cues

Marcelo Costa, Adsson Magalhaes and Balázs Vince Nagy

We used the magnitude estimation to obtain the apparent size of circles under two different experimental conditions: with a black background and with a line gradient to evoke depth perception. Twenty-two subjects with normal or corrected-to-normal visual acuity (mean age= 21.3yrs; SD= 1.6) were tested. The procedure consisted of two gray circles luminance of 40 cd / m2, 10 degrees apart from each other. On the left side was the reference circle (VA of 1.1 cpd) in which was assigned an arbitrary value of 50. The subjects' task was to judge the size of the circles appearing in the right side of the monitor screen assigning the number proportional to the changed size, relative to the reference circle. Seven different sizes (0.6, 0.8, 1.0, 1.1, 1.3, 1.4, 1.5 cpd at 50 cm) were presented in each condition. Our results have shown a high correlation for circle size and depth conditions (R= 0.987 and R= 0.997) between the logs of the stimuli and the subject response. The exponents obtained were 0.69 and 1.09, respectively. The circle size was judged subjectively closer to the physical size in the depth condition that in the condition free of other visual cues.