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Testing Vision: From Laboratory Psychophysical Tests to Clinical Evaluation

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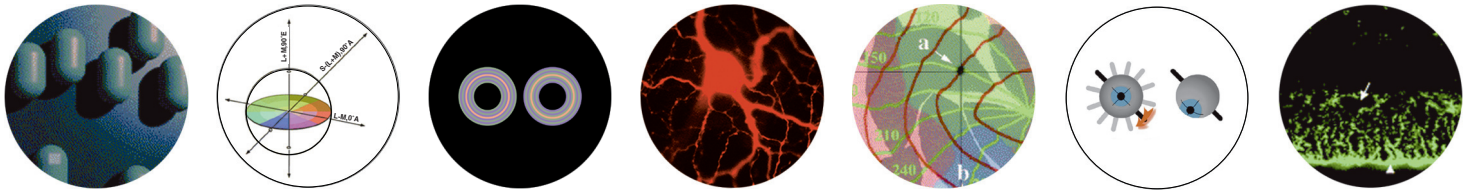

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Editorial

Testing vision: From laboratory psychophysical tests to clinical evaluation

Accurate and reliable evaluation of the visual function of patients is a critical factor both in diagnosing visual problems and in evaluating the outcome of clinical intervention. The scientific basis for measuring visual function in the laboratory is largely based on the details of signal detection theory and our knowledge of visual physiology. To be clinically useful, however, vision tests need to satisfy stringent requirements including high specificity and sensitivity, good test–retest reliability, robustness to individual variations in anatomical and physiological factors, as well as small variations in the testing environment (such as fluctuations in luminance), and still be quick and easy to administer. This Feature Issue contains reviews covering the historical background, the theoretical basis, and practical considerations for achieving useful measures of the most commonly tested visual functions in the clinic or in the laboratory.

Each of the nine articles in this Feature Issue focuses on a different but equally important aspect of human vision. Starting from the monocular assessment of visual function (although binocular assessment is also possible), the first four papers deal with the measurement of visual acuity (Bailey & Lovie-Kitchin, 2013) and contrast sensitivity (Pelli & Bex, 2013), the calibration by a novel method of electronic displays for clinical vision tests, especially those related to contrast manipulation (To et al., 2013), and perimetry (Johnson, 2013). The next two papers are concerned with the assessment of binocular coordination and function, specifically eye movements (Bedell & Stevenson, 2013) and stereopsis (Westheimer, 2013). The following two papers concentrate on clinical tests that are often performed on only selected patient populations, despite the fact that both measurements are intimately related to common daily activities. One paper considers the measurement of reading performance (Rubin, 2013) and the other visual processing speed (Owsley, 2013). The last paper proposes a new metric to predict visual performance arising from individual optical variations (Young, Love, & Smithson, 2013).

We believe that these articles will stand not as the end-point of years of investigation and analysis, but rather as the starting point from which vision scientists will develop the next generation of tests for the more efficient and sensitive diagnosis and monitoring of treatment and progression of visual function in clinical conditions. Likewise, we hope that clinicians will find the insights offered by the authors of help in applying and interpreting findings from their current generation of investigatory techniques.

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