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1. Applied Vision Research Centre, City, University of London, LONDON, London, United Kingdom.
TITLE: COLOUR ASSESSMENT OUTCOMES – A NEW APPROACH TO GRADING THE SEVERITY OF COLOR VISION LOSS
ABSTRACT BODY:
Abstract Body: INTRODUCTION: Recent studies have shown that a significant percentage of subjects with anomalous, congenital trichromacy can perform the suprathreshold, colour-related tasks encountered in many occupations with the same accuracy as normal trichromats. In the absence of detailed, occupation-specific studies, an alternative approach is to make use of new findings and the statistical outcomes of past practices that have been considered safe to produce graded, justifiable categories of colour vision that can be enforced.

METHODS: We analyzed traditional color assessment outcomes and measured severity of colour vision loss using the CAD test in 1363 subjects (336 normals, 705 deutan, 319 protan and 3 tritan). The severity of colour vision loss was measured in each subject and statistical, pass / fail outcomes established for each of the most commonly used, conventional colour assessment tests and protocols.

RESULTS: The correlation between the number of Ishihara (IH) test plates subjects fail and the severity of RG colour vision loss was very poor. The 38 plates IH test has high sensitivity when no errors are allowed (i.e., only 0.71% deutans and 0.63% protans pass). Protocols based on zero errors are uncommon since 18.15% of normal trichromats fail. The most common protocols employ either the 24 or the 14 plates editions with two or less errors. These protocols pass almost all normal trichromats, but the deutans and some protans that also pass (when two or less errors are allowed) can be severely deficient. This is simply because the most challenging plates have not been included in the 24 and 14 plates editions. As a result, normals no longer fail, but the deutans and protans that pass have more severe loss of colour vision since they fail less challenging plates. The severity of colour vision loss was measured in each subject and statistical, pass / fail outcomes established for each of the most commonly used, conventional colour assessment tests and protocols.

DISCUSSION: Historical evidence and new findings that relate severity of loss to the effective use of colour signals in a number of tasks provide the basis for a new colour grading system based on six categories. A single colour assessment test is needed to establish the applicant’s Colour Vision category which can range from ‘supernormal’ (CV0), for the most stringent, colour-demanding tasks, to ‘severe colour deficiency’, when red / green colour vision is either absent or extremely weak (CV5).
Learning Objective 1: To learn about the statistical outcomes of the various editions of the Ishihara test
Learning Objective 2: To understand how severity of colour vision loss can be quantified using a single test
Learning Objective 3: To become aware of a new system (that can be enforced) based on six categories for grading severity of colour vision loss.
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