

DALTONIANA

NEWSLETTER

OF THE INTERNATIONAL RESEARCH GROUP ON COLOUR VISION DEFICIENCIES

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THIS ISSUE CONTAINS THE CALL FOR PAPERS AND THE PRELIMINARY INSCRIPTION FORM FOR OUR FOURTH SYMPOSIUM (Parma, june 1977).

LITERATURE SURVEY

Latency differences to monochromatic stimuli measured by disjunctive reaction time, by P.D. JONES and H. WILKINSON (University of Louisville), Perceptual and Motor Skills, 41, 55-59, 1975.

The target was a 1°45' disc surrounded by a 10° achromatic annulus. In a first study, to four subjects three monochromatic stimuli, 440 nm, 510 nm and 654 nm and an equally bright achromatic stimulus were presented in a random order. During reaction time (RT) testing the subject was instructed to lift his finger when a chromatic stimulus appeared and to withhold the response when the stimulus was achromatic (disjunctive RT paradigm). The results suggested a trend toward shorter RT to longer wavelength stimuli. In a second study to two well-practised subjects the monochromatic stimuli 510 nm and 654 nm were presented in a random order with an equally bright achromatic stimulus. A reliable difference in perceptual latency was found as a function of wavelength (RT longer for green). The results suggest that latency differences as a function of wavelength are demonstrable in a situation in which the subject must react to chromatic information as differentiated from brightness information. - Ingeborg Schmidt.

Spectral sensitivity of the oscillatory potentials I. On the Mice, by I. WATANABE and K.A. HELLNER (Universitäts-Augenklinik, Hamburg, 2 Hamburg 20, Martinistrasse 52, Deutschland; Present adress of Watanabe : Department of Ophthalmology, School of Medicine, Nagoya University, Nagoya, Japan), Acta Soc ophthal. jap. 78, 1449-1455, 1974.

1. The absolute threshold of the b-wave is 1.7×10^{-10} lm/mm².
2. The type of the spectral sensitivity curve of the oscillatory potentials differs depending on the adaptive conditions :
a) The low threshold oscillatory potentials coincide with the absorption curve of rhodopsin; b) Ordinary oscillatory potentials present a broader spectral sensitivity curve compared with that of rhodopsin. The broadness of the curve is due to the influence of a component other than rhodopsin. A subpeak at 540 nm and a subpeak at 600 nm are detected in their spectral sensitivity curves, proved to be of retinal origin.
3. The experiments on the dark adaptation in the oscillatory potentials lead to the conclusion that two components in the retina are required.
4. From these experimental results it is concluded that :
a) the subpeaks at 600 nm and at 540 nm are retinal functions, and b) the oscillatory potentials of the mouse reflect the function of both photopic and scotopic elements of the retina.-
Yasuo Ohta.

Color vision and brightness discrimination in two-month old human infants, by D.R. PEEPLES and D.Y. TELLER (Psychology Department, University of Washington, Seattle 98195, USA), Science 189, 1102-1103, 1975.

Evidence was presented that two-month-old human infants can discriminate a colored from a white light solely on the basis of their difference in wavelength composition. Two-month-old infants consistently located and stared at a white bar embedded on a white screen and varied in intensity. Only an increment of 5% (0.02 lg units) above the background intensity was small enough that an infant failed to stare at the bar. The infants stared at all intensities of a red bar which was presented on the white screen starting from the adult red-white brightness match and exploring in small steps a range of intensities about 0.4 log units above and below the adults brightness range. - Ingeborg Schmidt.

Color vision : blue deficiencies in children, by A.J. ADAMS, R. BALLIET and McADAM (School of Optometry, Univ. of California, Berkeley, California, 94720 and Smith-Kettlewell Institute of Visual Science and Dept. of Visual Sciences, Univ. of Pacific, San Francisco, California 94115, USA), Invest. Ophth. 14/8, 620-625, 1975.

413 school children, ages 3 to 10, were tested with both the Farnsworth Panel D-15 test as well as the AO HRR plates. None of the children failed either test for blue-yellow vision when the traditional scoring instructions were observed. The children made a number of minor errors which adults rarely make. The errors were age-related. Retesting reduced significantly all error types. Reversing the test sequence demonstrated that most of the minor errors were made in the last half of the test. The authors hypothesize that the errors of blue vision with young children are a consequence of the way in which the test was administered and scored. - Ingeborg Schmidt.

Acquired blue-yellow defects (Dyschromatopsies acquises d'axe bleu-jaune), by A. PINCKERS (Dept. of Ophthalmology, Univ. of Nijmegen, Netherlands), Ann. Oculist. (Paris) 208, 659-666, 1975.

Acquired blue-yellow defects were selected by means of the H-R-R test. Three cases showed a tetartan defect and 74 a tritan defect. The plates on page 19 are the least sensitive in detecting a blue-yellow defect. Once an acquired blue-yellow defect is selected by means of the AO H-R-R test, the FM 100 hue shows a tritan pattern in 70%, the Panel D-15 in 40% and the F2-plate in 11% of the cases. Acquired blue-yellow dyschromatopsias occur in clouding of the ocular media, if infiltrates, exsudates or transsudates are present in the retina, and in processes primarily involving the choriocapillaris, Bruch's membrane and the pigment epithelium. - A. Pinckers.

Macular vitelliform degeneration, (La dégénérescence vitelliforme de la macula), by P. FRANCOIS and P. TURUT (41, Rue d'Artois, 59 Lille, France), Arch. Ophtal. (Paris), 35, 609-626, 1975.

Beautiful study and review of literature. In 29 cases colour vision was examined by means of the FM 100 hue. In only two cases the total error score (C.I.) was less than 100; in the 27 other cases there was a slight defect (C.I. ; 100-200) or a severe one (C.I. > 200); there was no definite type of acquired defect, the "axis", if present, varying from case to case. On the basis of ERG, EOG, fluography and colour vision examination the authors conclude that even in the first stage there is a lesion of the cones. - A. Pinckers.

Farnsworth 100 hue-test in diagnosis of ethambutol-induced damage to optic nerve, by D. TRUSIEWICZ, (Dept. Ophthal., Central Railway Hospital, Warszawa, Poland), Ophthalmologica 171, 425-431, 1975.

The author describes 3 cases of ethambutol induced toxic optic neuropathy; in one case the acquired colour vision defect was superimposed on a hereditary defect. Disturbance of colour vision may be the first sign of toxic optic neuropathy. Interpretation and evaluation of colour vision by means of the PIC tables is difficult; the F.M. 100 hue is of great value and permits a reliable follow-up. - A. Pinckers.

Color discrimination in maculopathies and diseases of the optic nerve by D. TRUSIEWICZOWA, A. KORDALEWSKA and W. SZELIGA, Klinika Oczna, 10/11, 1085-1096, 1975.

Twenty six patients were examined by means of Nagel's anomaloscope, pseudoisochromatic charts, the Farnsworth-Munsell 100 hue test and the Farnsworth Panel D-15 test. In macular disease the most frequently observed defect is a

blue-yellow one; in conditions concerning the optic nerves, the defect is red-green, blue-yellow or without prominent axis. The Farnsworth-Munsell 100 hue test was administered in the same patient twice or three times in the active period of the disease in order to watch the dynamics of the pathological process. The authors present the collected results as well as 3 cases illustrating the value of examination of color discrimination in maculopathies, optic atrophies and toxic retrobulbar neuritis as a side effect of ethambutol. - Felicia Jakubik.

Macular holes, by M. STARZYCKA, A. CIECHANOWSKA and H. JANOTKA, Klinika Oczna 10/11, 1169-1174, 1975.

The authors present the results of clinical observation and detailed examination of macular function in 11 eyes of 10 patients with laminar macular holes. Among them two subjects presented a deficiency of color vision in both eyes. The diagnosis has been established on the basis of the ophthalmoscopic fundus picture. In the period of 1-4 years of observation no progress of the pathological process could be stated and the functions of the affected eye remained on the same level. Visual acuity was at least 5/50. These observations show that in cases of laminar holes no treatment should be undertaken. - Felicia Jakubik.

Personal view, by A. SEATON, Brit. med. J., vol. 4, nr. 5992, 8 nov. 1975.

This is an interesting account of the disabilities found by a chest physician arising from being a red-green colour defective. - W.O.G. Taylor.

A simple apparatus for predicting the changes in color for varying illumination conditions (Un semplice dispositivo per predire la variazione di colore in diverse condizioni di illuminazione) by S. STEFANACCI and U. RAMACCIOTTI, Atti Fond. G. Ronchi 30, 653, 1975.

A simple apparatus is described, which allows to estimate the shift in the appearance of a color under different illuminations. The procedure is based on the binocular match method. The sensation mediated by the left eye, under given illumination conditions, is transferred into the set of percepts mediated by the right eye, presented with the caps of the 100-Hue test, under C-illumination. - Lucia Rositani-Ronchi.

CORRESPONDANCE

ABOUT THE X-CHROM LENS (will not be published elsewhere)
Pat. R, 36 years old, with hereditary red-green defect, hoped to obtain better colour discrimination if one eye was fitted with the X-chrom lens.

Results of colour vision examination, two eyes simultaneously :

I test with X-chrom lens on the left eye

AO H-R-R : 1 error in diagnostic series, the plate protan-7;
Ishihara XIIth ed. : S+, C^{7pa}/1-, E³⁺⁵-, CE³⁺⁷/1-, P¹⁺³-, D+;
FM 100 Hue : BDT; CI = 329; C = 54 and 15.

II retest without X-chrom lens

AO H-R-R : missed 5 protan plates (7, ⁹/12) and 1 deutan plate
(10);

Ishihara XIIth ed. : S+, Cpa, E-, CE+, P-, D+;

FM 100 Hue : BD; CI = 230; C = 59 and 16.

After 1 month the subject abandoned the X-chrom lens wearing,
because in daily practice colour discrimination was not improved. -
A. Pinckers.

ANNOUNCEMENTS

THE XIV ISCERG SYMPOSIUM

This symposium, dedicated to the late Hermann M. BURIAN,
will be held from 10th to 14th may 1976 in Louisville (U.S.A.).

The main themes are "The Correlation of Electrophysiological
and Psychophysical Measures" and "Electroretinography in Heredi-
tary Retinal Diseases".

The guest speakers are Lorin RIGGS, John C. ARMINGTON and
Eliot L. BERSON.

The organizer is Theodore LAWWILL, M.D., Department of
Ophthalmology, University of Louisville, School of
Medicine, 301 East Walnut Street, LOUISVILLE,
Kentucky 40202, U.S.A.

CONFERENCE ON COLOUR DYNAMICS

This meeting will be held from 8th to 11th june 1976 in
Budapest (Hungary)

The main themes are "Theoretical colour dynamics",
"Practical colour dynamics" and "Colour dynamics and the
associated professional fields".

Secretariate and address of the Conference :
Magyar Elektrotechnikai Egyesület
1055 BUDAPEST, Kossuth Lajos tér 6-8
Hungary.

FROM THE IRGCVD STANDARDIZATION COMMITTEE

1. Summary of the Report of the Working Party on Standardization of the International Research Group on Colour Vision Deficiencies, by J.J. VOS (Institute for Perception TNO, Soesterberg, The Netherlands).

1. INTRODUCTION. - In 1970 the IRGCVD decided to establish a standardization committee with the task to standardize test methods and nomenclature in the field of colour vision deficiencies. This task turned out to be too comprehensive, and therefore it was decided, in Edinburgh, to follow a more gradual course and to first attempt to answer the question whether and where normalization should be considered urgent. The undersigned was appointed coördinator of a yet to be formed working party to investigate these needs. The following scientists took part in this working party : J. Birch-Cox (UK), J. Boogaard (Neth), G.A. Fishman (USA), P. Grützner (FRG), A. Linksz (USA), M. Maione (It), J.L. Pinckers (Neth), W.O.G. Taylor (Scotld), G. Verriest (Belg).

To investigate the needs an inquiry was made on two specific points : a) An inventory was made of current and no longer current colour vision tests, and a judgment was asked from the members of their experiences with these tests; b) An inventory was made of ambiguous and ill-defined terminology, and a judgment was asked from the members of their interpretation of these terms.

2. INQUIRY ON CURRENT AND NO LONGER CURRENT TESTS. - By scanning a number of well known textbooks an inventory was made of current colour vision tests as well as those no longer current.

About most of the fifty tests, thus found, insufficient information was obtained from the inquiry to make up a "consumer-report". Some of them surely have a historical meaning only and have disappeared from the scene for good reasons; others may be scientifically sound but only restrictedly obtainable. But whatever the reason, from a practical point of view we could only conclude that they are of little interest to incorporate them presently in a standardization procedure.

On the other tests sufficient and sufficiently useful information was obtained from the respondents to justify reporting. This is done in Table I, which should be considered as summary of judgments of individual respondents, surely not as a final judgment of the International Research Group on Colour Vision Deficiencies.

In the opinion of the Working Party standardization can be most pragmatically described as a process of gradually removing the worst to finally retain the best. In that sense the above described evaluation can already be considered as a contribution to standardization in itself. In the first place the result strongly suggests that, to communicate with other investigators it deserves recommendation to at least classify subjects with one or some of the tests of Table I. In the second place our approach may be interpreted as an invitation to manufacturers and investigators to strive for a place on the list for their favorite test. It is clear that the rather arbitrary constituency of our Working Party does not guarantee that the list of Table I is final in whatever sense. One might consider to establish a sort of central bureau where manufacturers can register tests on production of sufficient and sufficiently documented reports from open literature on its performance.

3. NOMENCLATURE. - Nomenclature in vision research is well defined and standardized by the CIE (International Lighting Vocabulary, 3rd, 1970). The system of units adopted by the CIE links up completely with the system of SI-units adopted by the International Organization for Standardization IOS. There seems to be every reason to conform ourselves with the ISO-CIE terminology, which means, among other things, to drop ftla, mla, inches etc.

Of course the terminologies of the ISO and CIE are far from complete, to cover the domain of interest for students of colour vision deficiencies. A very useful supplement is offered by the Dictionary of Visual Science by Schapero, Cline and Hofstetter (Chilton Cy, 1960). Yet, one of the areas where more uniformity was explicitly put forward as a wish in Edinburgh, was that of nomenclature. To find out where these problems lie, an inventory of ambiguous or ill-defined terms was made by scanning glossaries and indexes. The harvest of problem-words turned out to be rather small, however. True, there are often many different terms for the same thing, e.g. : deuteranomaly, deuteranomalia, partial deuteranopia, deuteranomalous trichromatism, green weakness, incomplete green blindness; but mostly this multitude of terms is more historical than actual (in the example, there is a strong convergence to using the term deuteranomaly), and seldom they give problems in understanding. To make frantic efforts to standardize here seems rather wasted time. After sorting out this sort of pseudo non-uniformities, we were left with only a very restricted number of terminology problems, which were subjected to the judgment of the members of the Working Party by means of the inquiry.

These questions and answers, very shortly, were : Q : Do you object against the triad : protan-deutan-tritan? A : no
Q : What are colour amblyopia and colour asthenopia? A : skip these ill defined terms. Q : Are achromats different from cone- or rod monochromats? A : no, it is a collective noun. Q : What are the correct definitions of congenital, hereditary and acquired? A : hereditary = genetically determined, not necessarily present at birth; congenital = present at birth, need not be inherited, can be acquired; acquired = a non-genetical condition resulting from disease or injury, normally - but not explicitly - post-natal. It should be noted, however, that one respondent answered to regard congenital as indicating sex-linked inherited colour deficiency and hereditary as indicating acquired deficiency due to the onset of inherited pathology. Q : Can you define extreme anomalous trichromatism? A : a form of anomalous trichromatism close to dichromatism, operationally defined by the anomaloscope performance, but not a clearly defined entity on its own. It may characterize only a certain degree of trichromatism on a continuous scale from completely normal to fully dichromat. Q : Should we accept the misleading word colour blindness? A : yes, it is acceptable in communicating with laymen.

Surveying our reconnaissance through the terminology domain we can only conclude that few serious problems have been found. Acceptance of the few, hardly radical suggestions outlined above seem to be sufficient to eliminate most misunderstandings. The Working Party does not see a need, anyway, to undertake a full scale normalization procedure on colour vision deficiency terminology.

4. RECOMMENDATIONS. - In the previous sections implicit or explicit conclusions were drawn. In the following these in-between conclusions will be shaped in the form of recommendations to the assembly of the IRGCVD.

a. It is recommended that the IRGCVD establish a small committee of experts that is responsible to set up and keep a list of qualified colour vision tests. Anyone be entitled to request admission of a test on the list, provided he can produce sufficient and sufficiently documented reports from open literature about its performance.

It is recommended further that the same committee set up and keep a list of lamp specifications with particular emphasis on the colorimetric data. Anyone be entitled to ask admission of a lamp on the list, provided he can produce sufficient and sufficiently reliable data on its performance. A regular revision of the list - and publication of the revised list is open literature - shall be obligatory.

b. It is recommended that no large scale standardization procedures be undertaken on the point of nomenclature. It is recommended that the conclusions of the Working Party on the six controversial questions on nomenclature be transmitted to editors of dictionaries on visual science. It is further recommended that authors follow the recommendations of the ISO and CIE as to terms, units and symbols.

2. Comments and New Trends, by Mrs. J. BIRCH-COX (Dept. of Ophthalmic Optics, City University, Cranwood Street, London EC 1, England).

1. This summary of the report of the Working Party on Standardization will be published in the proceedings of the 1975 symposium. As only a few copies of the report were available in Amsterdam and no general discussion was possible, the summary is reproduced here and comment invited.

2. The terms of reference of the present Working Party have already been published in Daltoniana. It has the following members : A.R. HILL & W.O.G. TAYLOR (G.B.), M. MAIONE (Italy), G. VERRIEST (Belgium), E. HANSEN (Norway), J.J. VOS & A.R. PINCKERS (Netherlands), P. GRÜTZNER (DBR), Y. OHTA (Japan), A. LINKSZ & G. FISHMAN (U.S.A.), A. ROTH (France), B.V. GRAHAM (Canada), D.P. SMITH (Australia), K. VELHAGEN (DDR), J. BIRCH-COX (G.B., Chairman).

3. The Working Party has now agreed on guidelines to be sent to manufacturers and publishers of colour vision tests and illuminants and to professional bodies as follows : -
..... It is envisaged that a register of colour vision tests and illuminants will be published early in 1977. The type of documentation that the group would like to accompany colour vision tests would include the design parameters and test procedure together with test performance. The design parameters should include the chromaticity coordinates and reflectance of the colours and the required illuminant should be stipulated. Screening efficiency and diagnostic efficiency for both congenital and acquired defects should be confirmed in a field trial. In some cases the effect of the normal ageing process, the use of different illuminants and the effect of reduced visual acuity should be determined. Standard references will be included in the report and a user rating (similar to the ratings of consumer organisations) will be applied to the available commercial tests. In the case of illuminants documentation should include the following--the colour temperature, the colour rendering index, the UV component, the C.I.E. coordinates and the level of illumination. Indication of performance in a field trial is also desirable...

4. The data presented in table 1 of the above report is being extended and more tests included. The help of members is requested with regard to the following tests, if you have any information would you please write to me. We would like to confirm that the following tests are no longer available

but would also like detailed information from anyone who has used them extensively using table 1 as a guide to the type of information required : Boström plates, Hertel-Stilling plates, Ellis-Freeman plates, Nagel, Cohn, Podesta and Meyrowitz charts, Wiltberg colour test.

The same type of detailed information is required for the following tests which are in current production : Guy's colour vision test for children, The Lovibond colour vision analyser, The City University colour vision test, The Beyne Lantern, The D&H colour rule. Similar information is required for the Rabkin and Polack pseudo-isochromatic plates including the names and addresses of the publishers.

5. Nomenclature : Although the report suggests that few ambiguous terms exist, there are still a great many terms with similar meanings. Better understanding would be achieved if writers were to use standard nomenclature. A list of preferred terms is therefore being considered by the Working Party.