MAYER-KRAN™

DOUBLE-HAPPY™ CONTRAST SCREENING TEST
Instructions for Testing

EC REP QNET BV
Kantstraat 19
NL-5076 NP Haaren
The Netherlands

USA Precision Vision®
1725 Kilkenny Court • Woodstock IL 60098 • USA
precision-vision.com

MAYER-KRAN™

DOUBLE-HAPPY™ CONTRAST TEST SCREENING TEST
Instructions for Testing

Assessment of contrast sensitivity (CS) is an important component of a comprehensive eye examination. The test should be administered by a vision health professional, or a person trained in administering vision tests. The test results should be interpreted in the context of the individual's overall presentation and the results of the individual's eye examination. If the individual's test shows abnormal results, we recommend retesting, preferably by a different tester who is unaware of the first tester's results. *A CS test does not replace the eye examination.*

This set of M-K Double-Happy Contrast screening cards is intended to be used to test any individual who is unable to match or name symbols or letters. Screening for abnormal contrast sensitivity assesses whether the individual should be referred for a complete eye examination. If the individual's CS screening test results are normal or near normal, however, this does not rule out the need for regular routine eye examinations.

The M-K Double-Happy Contrast Screening test is not intended to accurately measure a person's sensitivity to contrast. This test is intended to show whether a person's performance is normal or below normal. The below normal contrast sensitivities for the face stimuli are selected to represent a range of severity of contrast loss. The table at the end of this document (p. 4) shows the contrast and logCS values that are included in this DH contrast screening set. If the person tested does not detect a face contrast below a certain contrast level or (above the equivalent logCS level) then a loss of CS is suspected. Qualitative loss categories corresponding to the Double-Happy contrast values are shown in the column on the far right of the table on p. 4. These loss categories are based on the experience of clinicians who assess adults with diseases of the retina and optic nerve, such as due to glaucoma or diabetes. The values are based on letter CS tests. The loss category column also indicates performance difficulties associated with the severity of loss. Information on screening values for children of a given age range is provided on p. 5.

The M-K Double-Happy Contrast Screening Test consists of 6 cards printed with a schematic smiling face. The face elements on each card are darker than the white card. The darkness of the face relative to the background is calibrated in percent contrast (Weber formula). Contrasts range from nearly black (89%) to very dim (2.2%). (The face contrast values are converted into contrast sensitivity).[1]Contrast sensitivity is an important aspect of our vision – for example, when reading, if print is too low in contrast, we will not be able to read it, or, when walking, if a step does not contrast well with the next step, we may miss the step and fall. The lower the contrast of an object a person can detect, the higher is their sensitivity to contrast. The logCS values can be related to difficulties in visually guided activities in adults. For example, logCS values ≤ 0.9 may be associated with a serious disability in walking, ≤ 1.3 may result in significant difficulties in recognizing faces, and <1.4 may cause significant limitations in reading (see table for references).

[1]Contrast sensitivity (CS) is reported differently than percent contrast although it is derived from percent contrast. We use the logarithm of CS when reporting contrast sensitivity, or $\log_{10}$CS. You will see that printed on the M-K Double-Happy cards along with % contrast. Log_{10}CS is a useful scientific number.

We emphasize, however, that logCS values for the M-K Double-Happy test (or any other test in children) have not been studied in relation to performance in activities that children engage in. So, the severity of loss values should be considered as only general guidelines for children.

Contrast ability is reduced in low lighting. We strongly recommend testing the person with the M-K Double-Happy Contrast Screening Test in a well-lighted space, without glare on the cards.

The goal of the M-K Double-Happy Contrast Screening Test is to determine the lowest contrast face that the person detects in this set of faces. To do this, the face cards are shown in order, from highest to lowest contrast. The tester judges for each card whether the person detects the face (either by looking towards the face or by pointing or saying right or left). The tester can view the person through a central peephole in the card, or over the top of the card if this does not distract the person from looking at the face cards. Before you begin testing, measure 40 cm test distance from the card to the person's face using the width of the card which is 40 cm. After measuring test distance turn the card face down and away from the person until you are ready to present the face in the correct manner. Measure distance during the test as well if the person comes close to the cards. Or, if possible, stay loose and move the Double-Happy card back an approximately equal distance as that of the person.

1. Starting with the highest contrast face, 89% (Card A), **show the front of the card to the person without being aware whether the face is on the person's right or left.** If the person looks to one side of the card (for example, to the right) suggesting the face is on that side, rotate the card 180 deg. If then the person looks to the opposite side of the card (left), it is likely that the person detects the face on that card. After you judge that the person detects the face on the card, you can check the front of the card to see if you were correct in judging the right or left location of the face. **However, do not look at the front of the card until you are sure the person sees the face.** This is because on 50% of the presentations, the person may randomly look to one side, not actually seeing the face on that side. Your task is to make an integrated judgment on whether the person detects the face on that card.

2. If you judge the person detects the face on the 89% contrast card, test the next contrast level, 50% (Card B), in the same way. Present this card 2 to 3 or more times to be sure the person sees the face on that card. Occasionally you may present the card in the same orientation between trials, not rotating the card; in this way you can avoid the tendency of people to alternate direction of gaze, or to anticipate that you will show the face on the opposite side.

3. If you judge the person detects the 50% contrast card, now test the next lower contrast face, 8.9% (Card C), in the same way as you did for the previous two cards. Make your judgment as to whether the person detects the face on this card based on 3-4 presentations.

4. Continue testing the face cards in series until you reach a face contrast that you **are unsure** the person detects. Set this card aside and retest face of higher contrast to be sure the person detects it. If the person detects the face, test the lower contrast face again.

5. You may observe the person actually detects the face on the card that you formerly thought they did not. Be sure to test it sufficiently to confirm this, staying unbiased.

6. If you reach the 2.2% contrast card (Card F) and you judge the person does detect this face, you have completed the test. If the person is a young child, s/he likely has normal contrast sensitivity (see normative information following the table of contrast values). If the person is an older individual, his/her contrast sensitivity is probably near normal (see information following the table).

7. If you judge the person does not detect the lowest contrast cards, you can compare the card s/he does see with the severity loss categorization. (See right column in table on p. 4)
This table is followed by estimated binocular screening values for children, adult norms and adult disability associated with logCS in different activities (p. 5).

The Mayer-Kran Double-Happy Contrast Test was developed by Dr. D. Luisa Mayer, Associate Professor, and Dr. Barry S. Kran, Professor, of the New England College of Optometry. The test name is trademarked and the test itself has a patent pending (U.S. Patent Application No. 16/943,285 NM:132721-1 BSL).

Publication citation:
Mayer DL, Taylor CP, Kran BS. **A new contrast sensitivity test for pediatric patients.: Feasibility and inter-examiner reliability in ocular disorders and cerebral visual impairment.** Translational Vision Science & Technology 2020:30 (1-9)

MAYER-KRAN™ DOUBLE-HAPPY™ SCREENING SET

CARD	% Contrast (C) (Weber)	log Contrast Sensitivity (logCS)	If person can detect the face on this card and no lower contrast (higher CS); This is the qualitative categorical loss *(Performance levels in relation to severity of contrast loss)**
A	89	0.05	Near Total Loss (*Vision alone is unreliable for contrast judgments*)*
B	50	0.30	Profound Loss (< 0.40 logCS) (>40% C) (*Visual performance is marginal even with assistance*)*
C	8.9	1.05	Severe Loss (0.80-1.0 logCS) (10% - 16% C) (*Performance is slow, even with assistance*)*
D	6.3	1.20	Moderate Loss (1.1 - 1.3 logCS) (4.5 - 6.3% C) (*Some assistance is needed*)*
E	3.2	1.50	Near Normal (1.4 - 1.6 logCS) (2.5 - 4% C) (*More difficulties in activities can be overcome*)*
F	2.2	1.65	Normal depending upon age^

*The qualitative categories of CS loss (last column) are based on those accepted for adults based on letter contrast sensitivity tests.

**Performance levels (for adults) are provided by August Colenbrander (Visual Standards. Aspects and Ranges of Vision Loss with Emphasis on Population Surveys. International Council of Ophthalmology, 2002. Available at: http//www.icoph.org/downloads/visualstandardsreport.pdf*

Extrapolating the above adult qualitative CS loss categories to children is speculative and could be questioned. Further, the M-K D-H test requires detection of the stimulus, not identification of a symbol as in adult tests. Detection tasks can overestimate results based on letter identification tasks which means that CS loss could be more severe when the child can be tested with letter CS tests.

To date there are no age-related norms for Mayer-Kran Double-Happy Contrast Test.

Estimated binocular screening values for typical children of a given age range are provided below to aid in interpreting screening test results for young children. These values are based on limited data in the literature.

1 to 2 years: 1.2 logCS (6.3% Weber contrast
>2 to 4 years: 1.5 logCS (3.2% Weber contrast)
5 to 6 years: 1.65 logCS (2.2% Weber contrast)

A child in one of the above age ranges who does not, at a minimum, detect the logCS card indicated, should be:

1) Retested with the M-K D-H screening set by an independent tester
2) Monitored for possible visual problems
3) Referred to an ophthalmic professional

ADULT NORMS

The normative cutoff for adult CS used in the Berkeley Laboratory (per Dr. Ian Bailey) is $\geq$ 1.7 logCS. Normative cutoff for adult CS using Pelli-Robson and Mars letter contrast tests is 1.8 logCS.

Disability for specific activities associated with logCS (adult studies)

Walking	$\leq$	0.90 logCS[a]	
Fear of falling when walking	$\leq$	1.5 logCS[b]	
Reading	<	1.4 logCS	50% disabled[a]
	<	0.6 logCS	90% disabled[a]
Face recognition	$\leq$	1.3 logCS[a]	

[a]West SK, Rubin GS, Broman AT, Munoz B, Bandeen-Roch, Turano D for the SEE Project Team. How Does Visual Impairment Affect Performance on Tasks of Everyday Life? Arch Ophthalmol. 2002;120:774-780.

[b]Ramulu PY, van Landingham SW, Massof RW, Chan ES, Ferrucci L, Friedman DS. Fear of falling and visual field loss from glaucoma. Ophthalmology. 2012;119:1352–1358.