Development of the Hanks Paediatric Test Cards

Document: 00201 Last edited: 2/9/09
Author: Anthony Hanks, OD

The *Hanks Paediatric Test Cards** were developed by an Australian optometrist - Anthony Hanks, OD. They are designed for use when evaluating the vision of young children.

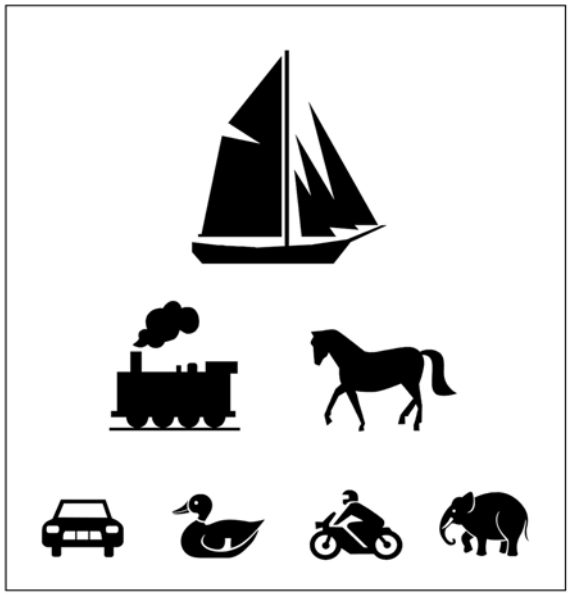
PAEDIATRIC SYMBOLS

There were two important considerations in the development of appropriate symbols for use with young children:

1: Recognition

For the testing of vision to be valid, the symbols must be recognisable to the subject. However, some commercial children's eye-charts use silhouettes of objects that are often not familiar to a significant number of subjects.

For example, a horse, yacht, steam train or wheelbarrow? If the child has never seen a wheelbarrow before, they are unlikely to name it correctly in a sight test.



Example of a chart using targets with poor recognition by children

The symbols or optotypes on the *Hanks Paediatric Test Cards* were drawn by the author using graphics software. First a range of potential symbols was created for possible use on a visual acuity test:

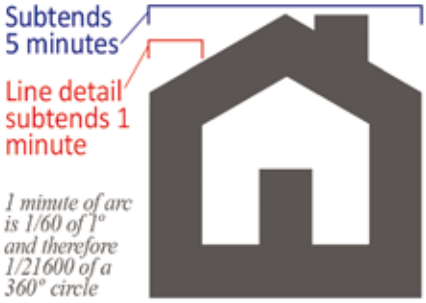
Then subjects between the ages of 2 and 5 years were asked to identify large versions of the drawings to confirm that they could indeed be recognised. Some images were widely recognised while others (like the ball) were found to be too obscure in this age-group.

On the basis of these clinical trials the following images were selected for use as the optotypes in the *Hanks Paediatric Test Cards*:

2: Calibration

The optotype symbols were then tested to establish equal recognition at the limit of vision. Some potential symbols were found to be too easily recognised - for example, the 3 dimensional house and the cake had too much internal detail that was falsely improving the ease of identification when compared to other targets.

The symbols were then calibrated for line thicknesses so that they represented the correct visual angles for accurate visual acuity measurements.



EFFECT OF CROWDING

There is a difference in the visual acuity when measured with single symbols (flash-cards) and when measured with crowded symbols (line charts).

The first set of test-cards show the smallest symbol that can be seen when there is no disturbing visual information created by crowding.

The second set of symbols is more difficult because *Contour Interaction Bars* (*Crowding Bars*) have been added. These produce results that are more comparable to a standard line chart and are generally up to two lines worse than the measurements taken with single (uncrowded) symbols.

The *Hanks Paediatric Test Cards* have been designed with the *Contour Interaction Bars* printed in red surrounding a black optotype so as to induce a greater level of interest in visual acuity testing for young children. The red colour was selected because scientific studies have shown no statistical difference for clinical results between black and red bars, while there were differences for other colours (like green and yellow).

The bars are positioned on each side of the symbol at a distance equal to half the width of the symbol.

ILLITERATE E

The paediatric optotype called *Illiterate E* has been in general use by optometrists for many years. These are also included with the *Hanks Paediatric Test Cards*.

MEASUREMENT DISTANCE

Visual acuity is normally measured at a distance of 6 metres or 20 feet from the subject. However, with small children it may often be necessary to use a shorter distance so that the examiner is able to successfully engage the subject in the task.

If a shorter distance is used (for example - 3 metres in an indirect room), a table can be used to convert the results to standard 6 metre (or 20 feet) notation.

DUOCHROME

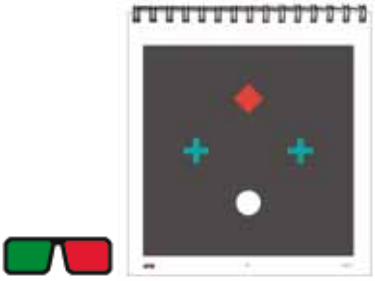
This is another test that has been in wide clinical use for many years. As a test for refractive error it is based upon chromatic aberration, whereby the different wavelengths of light (corresponding to different colours) are bent to different extents.

As a result, a clearer green target normally indicates that the subject's eye is hyperopic (long-sighted), while a clearer red target indicates myopia (short-sightedness).

However it is important to note that results for this test can also be affected by the subject's accommodative effort and that this is especially relevant for children (unless a cycloplegic has been used).

WORTH 4 DOT (WFD)

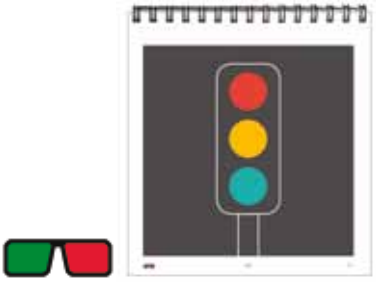
This is a test for binocularity and is conducted with the subject wearing red/green anaglyph filters (red on the right eye).



The number and the colours of the targets seen by the subject confirms their binocularity, or indicates whether any suppression is of the right or left eye.

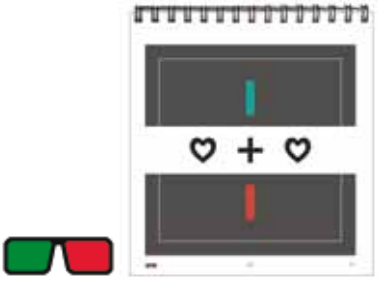
TRAFFIC LIGHTS (TL)

This is another alternative test for binocularity and suppression. It is also conducted with the subject wearing red/green anaglyph filters (red on the right eye).



FIXATION DISPARITY (FD)

This is a test for misalignment during binocular vision and is conducted with the subject wearing red/green anaglyph filters (red on the right eye). The version included in the *Hanks Paediatric Test Cards* has been designed for binocular lock and steady accommodation.



This type of misalignment does not result in strabismus, but may reduce the subject's stereopsis and depth perception. Fixation Disparity can also create a stress on the fusional convergence effort and result in symptoms associated with sustained near concentration.

Fixation Disparity is usually measured in minutes of arc, or the prism power that reduces the measurement to zero (associated phoria).

**Australian Therapeutic Goods Administration; registered as a Medical Device (Class 1) - ARTG 164851.*