VISION TEST FOR CHILDREN*

USE OF SYMBOLS

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THE testing of visual acuity in children presents many problems. This is mainly because of the difficulties involved in separating intellectual development from visual development at an early age. There is a need to test visual acuity in children before intellectual development has progressed to a stage at which they are able to understand the more sophisticated visual tests normally used in clinical practice.

Because of this difficulty many tests have been devised to test children's vision. These are, notably, the E-test, the hand test of Sjögren, and the picture card tests of Brewerton and Beale-Collins.

There are disadvantages in all these tests. Picture tests depend largely on psychological interpretation of the figures before they can be understood and recognized by the child. There is also the difficulty in relating the pictures accurately to the Snellen sizes, so that some apparently small figures are much easier to recognize than other larger ones. This largely invalidates the test. The necessity of producing a silhouette of the object adds to the difficulty in understanding and interpretation by the child.

The E-test, which is the most popular, needs a reasonable level of intellectual development, and is often difficult to use at those ages at which it is most often required—around the age of three years. The E-test depends on the accurate development of spatial orientation by the child, and spatial orientation is often not fully developed at this age. The positions of up and down are much easier to learn than right and left, and because of this, the right and left positions of the E may not be properly interpreted by the child, even if they are recognized. Interpretation of the test by the examiner must therefore be difficult and inaccurate.

The Sjögren hand test is probably the easiest to use, but it also suffers from the same visuo-spatial problems as the E-test.

Visuo-spatial disorders are frequently met with in spastic children. It was because of the difficulties encountered in using the E-test in these children that a visual test was devised that did not involve visuo-spatial problems. The test devised has the advantage of requiring a low level of intellectual development, making it suitable for young children.

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Requirements for a Visual Test for Young Children

The Snellen method of grading the size of figures is the most practical, and if possible, when devising a test for children, the figures presented should conform to Snellen sizes.

Because spatial orientation is not well developed in young children, tests should not require recognition of direction, as in the E-test.

In all tests of form function one should need only to be able to differentiate the figures presented for the test. Understanding and psychological interpretation of the figures should play as small a part as possible. This fact is even more important in testing children's vision.

The figures must easily be recognized and differentiated from one another. Confusion should occur with all the figures simultaneously: that is, one figure should not be recognized or be able to be interpreted at a smaller size than any other. They should all theoretically be distinguishable at one Snellen size, and all become indistinguishable at the next smaller size. All the figures must therefore bear a similarity to each other.

There is no doubt that presentation of single figures gives a better apparent resultant visual acuity than the presentation of a row of similar figures or letters. This has sometimes been erroneously termed angular and cortical vision. There are various physiological reasons for this phenomenon, but, generally, children are able to recognize about one and a half lines more on the Snellen chart with the presentation of single figures than when a row of figures is presented. It is thought most practical to use single figures for young children.

Symbol Test

Three symbols are used in the test—the square, the circle, and the triangle (Fig. 1). These symbols are among the first shapes to be recognized by the developing child, so it should be possible to perform the test at an early age.

FIG. 1.—The symbols used for testing visual acuity in children.

The use of these three symbols has many advantages. It is easy to reproduce the symbols accurately according to Snellen sizes. Their shapes all bear a close similarity to one another, as they are all closed outlines enclosing a blank space. Thus all

produce a simple gestalt, so that figure and ground cannot be confused. They are also easily differentiated from one another, and this should mean that the blur point or point of non-recognition will occur more or less at the same size for all figures.

Finally, spatial orientation is not involved at all, and as all the symbols are already closed, there is no attempt by the child to close or alter the psychological meaning of the symbols.

FIG. 2.—Presentation of symbols on cubes.

The figures are presented singly on a cube, as shown in Fig. 2. Two similar cubes are made, so that each Snellen size is represented by two of the three symbols used in the test. The child has plastic reproductions of the symbols to point to in front of him, or hold up as required, as the separate symbols are shown to him.

This test is easily performed by children of 3 years and under. Little explanation of the test is required beforehand. Accurate assessment of the child's visual acuity is obtained because the test has the necessary requirements for this—reproduction according to Snellen sizes; easy recognition of the symbols; similarity, yet easy differentiation of the symbols; and good change-over from recognition to non-recognition.

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