A Learning Disability Screening Program in a Public School

The outline of a screening program for learning disabilities in a public school is presented in this paper. The screening program consisted of four standardized measures (Information Subtest of the WPPSI, SEARCH, Evanston Early Identification Scale, Bender-Gestalt) and six of the clinical observations suggested by Ayres. Forty-three kindergarten and first graders (25 males, 18 females) were tested and each child was categorized as low, moderate, or high risk for learning disabilities on each of the measures. Approximately 10 percent of the children were identified as at high risk for learning disabilities, but the children did not perform at the same risk level on all measures. A factor analysis of the four measures and six observations revealed that three factors prevailed in this screening program: cognitive abilities, fine motor control, and reflex integration. This analysis also indicated the importance of assessing neurophysiological immaturity in a screening program. The implications of the categories used are discussed.

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A mple evidence indicates the need in the school system for screening programs to identify the learning-disabled child (1). Yet many systems do not have routine procedures for the evaluation of children's learning capabilities. Identification of problems is left to the teacher's discretion, often an inconsistent process. Learning problems frequently are unidentified, mislabeled, or compounded by emotional overlay. Children who exhibit disruptive behavior are more often identified for evaluation and/or additional services than quiet, withdrawn children. Children who have learning disabilities frequently develop additional emotional problems, such as impaired self-esteem, which may lead to poor peer relationships (2-5). Therefore, the importance of identifying learning disabilities early through screening programs cannot be overstated.

Screening programs have not been adopted widely for various reasons. The few screening tests that exist often are directed toward specific
problem types and are not applicable to a wide population where a variety of difficulties may be found. For example, one of the most popular screening tests in use, the Denver Development Screening Test (6), was designed to identify serious developmental delays and does not identify children at risk for learning disabilities. In addition, prior to recent federal legislation, there has been a hesitancy to label children as having problems because of the lack of funds to provide the child, once labeled, with the necessary services (1, 7). Finally, the use of available standard assessment procedures, which often requires administration by specially trained personnel or involvement of many disciplines, can be both costly and time consuming.

Most screening procedures in use focus on cognitive/language abilities and visual motor integration. From an educator's frame of reference, this focus is understandable as cognitive and visual motor deficits are frequently the way children manifest learning disabilities in the classroom. One area often overlooked, however, is neurophysiological immaturity. A lag in neurophysiological development may indicate an underlying sensory integrative dysfunction, which can cause coordination deficits and learning problems (8). In fact, studies have shown that many learning-disabled children show soft neurological signs that may contribute to learning problems (9).

The actual percentage of the school-age population experiencing a learning disability is disputed. While some experts have given the range as anywhere from 5 to 30 percent of the total population, most believe a realistic estimate is 10 to 20 percent (10). The acceptance and use of screening programs would identify children who may be experiencing learning problems and who may benefit from remediation programs. This paper describes an attempt to develop a screening program that would use recognized and available measures which are relatively easy to administer and cost effective. The screening would cover two areas frequently examined, cognitive abilities and visual motor integration, as well as neurophysiological development.

**Method**

**Subjects.** Of the 80 consent forms distributed to kindergarten and first grade children in a Manhattan public school, 43 (53%) were approved by parents for participation in the screening program. Twenty-five were boys and 18 were girls. The 43 subjects ranged in age from 67 months to 86 months, with a mean age of 75.02 months. Standard deviation was 5.63 months. This school was selected because it was accessible to those conducting the screening. The occupational therapist was working in this school as part of a hospital-community liaison program. The school personnel had expressed interest in developing a screening program in order to provide better services for the children. All the children came from three classrooms that were heterogeneous with regard to expected learning ability. No previous formalized testing had been conducted with these children or in these classrooms.

**Materials.** Four tests plus clinical observations were used for the screening battery. The Information Subtest of the Wechsler Preschool and Primary Scale for Intelligence (WPPSI-I) was used to measure cognitive abilities. This subtest correlates \( r = .70 \) with the WPPSI full scale score (11). The Bender-Gestalt Test (12) was used to determine visual motor integration and was scored using the Koppitz scale (13). The Evanston Early Identification Scale (14) was also used because it is thought a figure drawing helps identify children who may have difficulty in school. Potential reading disabilities were screened by the SEARCH test (15). Finally, the six clinical observations suggested by Ayres (16) were modified (see

**Table 1**

<table>
<thead>
<tr>
<th>Risk Categories for Instruments Used in Screening Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>WPPSI information subtest (scale score)</td>
</tr>
<tr>
<td>High Risk</td>
</tr>
<tr>
<td>≤ 5</td>
</tr>
<tr>
<td>Bender-Gestalt*</td>
</tr>
<tr>
<td>Evanston (actual score)</td>
</tr>
<tr>
<td>SEARCH (actual score)</td>
</tr>
<tr>
<td>Six clinical observations</td>
</tr>
</tbody>
</table>

* Number of months below age level norms (based on errors in Bender and actual age in months).
The criterion for selecting the factor loadings was .35. The muscle tone (MUSTONE) observation did not load on any of the above factors.

Table 3 presents the percentages of children who were identified as falling into the moderate category or the high risk category for learning disabilities. As can be seen, five of the six clinical observations, as well as the Bender test, identify at least 10 percent of the total sample as being at high risk.

To evaluate whether the clinical observations and the cognitive test would identify the sample as low, moderate, or high risk, these categories for each test and for each observation were cross-tabulated. They were then examined for statistical significance by chi-square tests. Only 9 of the 45 chi-squares performed were significant at the .05 level. The significant chi-squares indicated that the SEARCH test identified the same children as did the Evanston test, WPPSI-I test, and muscle tone observation. In addition, the Evanston identified the same children as did the WPPSI-I, muscle tone observation, and flexion in supine observation. The observation of choreoathetosis identified the same children as did the eye pursuits and muscle tone observations. Finally, the observations of prone extension posture and flexion in supine posture identified the same children. Caution must be used in viewing these findings. Many of the chi-squares were significant because the tests and observations identified the sample as low risk, but few of these tests and observations identified the sample as high risk.

**Discussion**

The results of the factor analysis seem to indicate that, by using a few well-chosen tests, a screening pro-
Table 3
Percentage of Children Identified as Moderate and High Risk for Learning Disabilities by Four Standardized Tests and Six Clinical Observations

<table>
<thead>
<tr>
<th>Instrument</th>
<th>N</th>
<th>Moderate Risk</th>
<th>High Risk</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEARCH</td>
<td>43</td>
<td>30.2</td>
<td>9.3</td>
<td>39.5</td>
</tr>
<tr>
<td>EVANSTON</td>
<td>41</td>
<td>17.1</td>
<td>9.8</td>
<td>26.9</td>
</tr>
<tr>
<td>WPPSI-I</td>
<td>41</td>
<td>9.8</td>
<td>7.3</td>
<td>17.1</td>
</tr>
<tr>
<td>BENDER</td>
<td>42</td>
<td>47.6</td>
<td>14.3</td>
<td>61.9</td>
</tr>
<tr>
<td>PURSuits</td>
<td>41</td>
<td>34.1</td>
<td>19.5</td>
<td>53.6</td>
</tr>
<tr>
<td>MUSTONE</td>
<td>41</td>
<td>9.8</td>
<td>2.4</td>
<td>12.2</td>
</tr>
<tr>
<td>CHOREO</td>
<td>39</td>
<td>35.9</td>
<td>20.5</td>
<td>56.4</td>
</tr>
<tr>
<td>SUPINE</td>
<td>40</td>
<td>30.0</td>
<td>10.0</td>
<td>40.0</td>
</tr>
<tr>
<td>PRONE</td>
<td>40</td>
<td>20.0</td>
<td>47.5</td>
<td>67.5</td>
</tr>
<tr>
<td>ATNRQUAD</td>
<td>41</td>
<td>26.8</td>
<td>29.3</td>
<td>56.1</td>
</tr>
</tbody>
</table>

A program can be made less costly and less time consuming than this screening program. For example, by using either the SEARCH, WPPSI-I, or Evanston tests, one could obtain the same information about cognitive/language abilities that was obtained by using all three tests. One could then decrease the amount of time spent testing each child and the amount of time scoring and interpreting tests, and ultimately lower the cost of implementing a screening program.

The loading of the second and third factors, muscle control and reflex integration, point out the necessity for examining neurophysiological immaturity in a screening program. Because of the inclusion of the age discrepancy scores on the Bender-Gestalt in Factor 2, visual motor integration cannot be considered in isolation as has been done in other screening programs. Visual motor integration is only one component of muscle control. The existence of Factor 3 indicates that reflex integration is a separate area of development which should be explored when screening a child for learning disabilities. Since the exploration of neurophysiological development is within the domain of concern of the occupational therapist, it seems vital to include the therapist on the school team screening for learning disabilities. Pediatric occupational therapists are trained to observe and evaluate reflex integration, equilibrium response, and other neurophysiological attributes in children. The findings suggest the importance of observing these aspects of development.

It is interesting that muscle tone, which is involved in both muscle control and reflex integration, did not load in either Factor 2 or 3. Possibly the limited observation of muscle tone used in this study was not adequate or possibly the categories of normal, moderate, and high risk were not defined or limited clearly.

Since previous research (18) found that low Bender-Gestalt scores correlate with specific types of sensory integration problems, it can be assumed that some of the children identified by this screening program as being at moderate and/or high risk on the Bender-Gestalt have sensory integration deficits. Kimball (18) noted, however, that children with postural and bilateral integra-

tion deficits were not identified by the Bender-Gestalt test. Inclusion of the clinical observations in the screening should help to identify these children.

In Table 3, five of the six clinical observations, not muscle tone, identify a majority of the sample as being in either the moderate or high risk categories. If it is true that 10 to 15 percent of the population experiences some type of learning disability, the idea of "age appropriate" norms for the clinical observations can be questioned and should be explored further. Parmenter's study (19) suggests that poor integration of the asymmetrical tonic neck reflex (ATNR) is normal for males under 7 years of age.

It should be noted that age expectations are not established for the clinical observations for children 6 years and under. The results obtained from this screening program seem to indicate that the presence of other reflex postures (prone extension particularly) and positive clinical signs or observations at this age may be normal rather than an indicator of disability. For this reason, the use of risk categories for the clinical observations may not be appropriate with kindergarten and first grade children. More investigation is needed with this age group. Until normative data are developed, children who exhibit positive clinical signs without evidence of other deficits should be observed for an extended period of time. This will give a more accurate assessment of the child's true abilities.

Conclusions
Since adequate normative data in reflex integration are lacking with the 5-and 6-year-old age group, children should not be categorized as being at high risk for disability.
on the basis of reflex integration testing as suggested by the clinical observations. Instead, performance in this area should be observed over an extended period of time. If possible, children who exhibit any dysfunction should be placed in activities and programs that may facilitate development during this observation time in order to prevent disability. More data should be collected and better standards established before using reflex integration alone as an indicator of possible dysfunction with this age group.

The data indicated that few of the four tests and six observations used in the screening battery were in agreement in designating children in the high risk group. Thus, children could be categorized only as being at risk for a deficit in a particular factor area rather than at risk for a learning problem in general.

The categories of high, moderate, and low risk also have implications for the delivery of services. While the current law, PL 94-142 (20), allows for the provision of services for children at high risk for learning problems, a more active stance will need to be taken regarding children who fall in the moderate risk group. Some states are currently providing services to all children who exhibit "at risk behaviors." It is suggested that this should be more widely adopted. At the least, the children should be observed carefully for signs of deficiency in any of the areas tested. Ideally, some type of preventive program should be provided so that both learning problems and secondary emotional problems could be avoided.

Acknowledgments

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8. Ayres AJ: Sensory Integration and Learning, Los Angeles: Western Psychological Services, 1972
20. 94th Congress of the United States. Public Law 94-142 (S.6), November 29, 1975

Appendix

1. Muscle tone (MUSTONE): The degree of muscle tone was evaluated by passively extending the elbow joint of the upper extremities. Scoring was done using a 3-point scale with 1 = definite neuropotonicity; 2 = slight hypotonicity; 3 = normal.
2. Choreoathetosis (CHOREO): Choreoathetosis was evaluated using Schilder's Arm Extension Test. Scoring was on a 3-point scale. With 1 = definite choreoathetosis, 2 = slight choreoathetosis, and 3 = normal.
3. Eye pursuits (PURSUITS): Eye pursuits were measured by having the child visually track an object. Scoring was on a 3-point scale, with 1 = definitely poor, 2 = slightly irregular, and 3 = normal.
4. Flexion in supine (SUPINE): The child was requested to lie supine and assume a flexed posture with legs, arms, and neck in flexion, and held above the supporting surface. Slight resistance was applied to the forehead and knees. Scoring was on a 3-point scale with 1 = unable to assume; 2 = assumes with effort; 3 = holds position with slight resistance.
5. Prone extension posture (PRONE): The child was requested to lie prone and maintain a hyperextended posture with legs, arms flexed, and held high above the supporting surface. Scoring was done on a 3-point scale with 1 = unable to assume or holds posture 0-8 seconds, 2 = holds posture 10-19 seconds, and 3 = holds posture for 20 seconds or more.
6. Asymmetrical Tonic Neck Reflex in Quadruped Position (ATNQUAD) child was requested to assume a quadruped position and head was passively rotated to each side. Scoring was on a 3-point scale with 1 = definite flexion on passive head turning, 2 = slight flexion on passive head turning, and 3 = no flexion on passive head turning.