Early Identification of Handicapped Children through a Frequency Sampling Technique

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Abstract: A pilot study was initiated with three regular preschool classes (65 children) to determine the validity of identifying preschool handicapped children (3½ to 5½ years of age) through a frequency sampling technique. Seven 1 minute samples of academic behavior were developed for 4 year olds and nine 1 minute samples for 5 year olds. The 1 minute samples involved learning tasks all children were expected to achieve during the school year (e.g., matching colors). The frequency of correct responses of each child on the tasks was compared with other students in the school at the same age level. By noting all children performing in the lower 25% of frequency scores, a list of at risk learners was developed. When comparing the list of children identified through the frequency sampling technique with teacher identification of at risk children at the end of the school year, a correlation above .9 was found.

A top priority of congressional action for the promotion of programs for handicapped children is termed child find. The child find concept is based on at least two major conclusions about children who are disabled. First, many handicapped children are not detected until their late primary years in the second or third grade. Second, when the children are found and diagnosis is completed, much of the information is not directly related to daily instructional plans of remediation.

The roots of the delivery of special education services are founded in the early detection of any form of handicapping condition, rapid remedial assistance in learning, and return to or placement in the least restrictive educational environment. The referral process available for teachers becomes the initiation point for causing special education services to become operational.

The early childhood program is a key area from which a child find concept may evolve.

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As part of the project entitled Baltimore Early Childhood Learning Continuum, project personnel selected three classes in early childhood education to determine if children who had learning problems could be identified and assisted while remaining in a regular program placement.

Channels of Investigation

It was determined that at least three channels of identification were open to investigation:

- *Alternative 1:* Children would be identified when the teacher felt the child could profit from special education services. This meant waiting until the teacher had enough interaction with each child to feel comfortable in the referring process to initiate the referral actions.
- *Alternative 2:* A second means of identification considered was ability testing either through an achievement test or a battery of standardized instruments. The two factors that were considered obstacles to this approach were (a) that such testing was prohibitive in terms of cost and (b) that there are serious questions as to the cultural free aspects of tests that are available. In addition, the norming processes used to standardize the ability tests for young children are highly questionable.
- *Alternative 3:* The third identification alternative was to devise a screening process that has the following characteristics: (a) it should be easily administered by classroom teachers, (b) it should provide the earliest possible means of inschool identification of at risk children with a high correlation to teacher identification of at risk children at the end of the school year, and (c) it should have direct instructional relevance for remedial actions.

While each of the above was a viable alternative for early identification of handicapping conditions, it was determined that alternatives 1 and 3, teacher referral and screening process, would be combined to produce a pilot project. The conclusion was based on a review of the available literature relating to the identification of handicapping conditions in young children.

Review of the Literature

An Educational Resources Information Center search of related literature based on descriptors such as *Identification, Preschool Programs,* and *Education* revealed 32 current studies. The primary mode of identification within these studies was equally distributed over academic, social behaviors, developmental patterns, language development, and visual motor development categories. Not only does the mode differ, but as Glidewell and Swallow (1969) pointed out, the screening methods vary considerably from the interview, to full diagnostic batteries, to symptom surveys. However, only a small number of studies addressed themselves to the crucial issue: predictive validity. Keeping this deficiency in mind, there still remain significant guidelines currently in the literature to assist in the development of early identification instruments and procedures.

Bradley (1974) reported that when a team approach to learning problem identification was used for devising a learning profile and modifying kindergarten curriculum, a degree of difference was found favoring the experimental groups for more child improvement. The implication is that some form of identification will be slightly better than relying solely on the referral process.

A contrasting view was given by Keogh and Becker (1973). They have raised questions concerning the relevancy of any identification procedures depending upon criteria from outside the actual school environment. Their questions serve as cautions in the development of identification instruments: (a) How valid are the identifying or predictive measures? (b) What are the implications of diagnostic data for remediation or educational intervention? (c) Do benefits of early identification outweigh possible damaging or negative efforts of such recognition?

The validity question cited in this critique is the most important in the development of early identification procedures but remains unanswerable. There are few clear corresponding relationships between the identification of learning disabilities from screening procedures and subsequent school achievement. The reasons for a lack of successful progress in educational programs on the part of some children are complex. In addition, as Haring and Ridgway (1967) have indicated, a failure to progress satisfactorily in learning may be as much the fault of the learning environment as a function of the organism. However, Keogh and Becker (1973) postulated a most important guideline: Predictive validity will increase when the screening

material is relevant to the immediate school environment in which the child will function.

The above studies conclude contrasting views which may be interpreted to mean that some combination of teacher identification and screening with materials of immediate consequence to the school environment is the best means of finding handicapping conditions and effecting instructional change.

The two predictive validity studies reviewed yielded one correlational design and one longitudinal study. The correlational study (Amundson, 1972) was based on the Metropolitan Readiness Test and the Wizard of Oz Preschool Screening Program (Amundson, 1972) and showed $r = .90$ with an N of 23 pupils. The longitudinal study (Rubin & Krus, 1974) indicated the School Behavior Profile found the same identified problem kindergarten pupils in the fourth grade 42% of the time. Both studies tended not to use acceptable predictive criteria. However, it can be concluded that a need exists for identification instruments which have firm predictive validity.

Generally, the research literature indicates consensus on some important points: (a) Teachers of preschool children should be the basic identification agent of finding handicapping conditions of children in their charge, (b) any means of finding children who may need learning assistance that avoids standardized testing should be considered, and (c) no child should be labeled as at risk based on any previously administered standardized test in light of the inadequate reliability and validity of such instruments (Dykstra, 1967; Severson, 1972; Proger, 1972). The remaining potential seems to lie in some procedure that insures teacher agreement and predictive outcome of immediate program change.

Based on a pragmatic approach, the administration and staff of the Baltimore Learning Continuum Project, which provided comprehensive special services to young handicapped children within regular preschool and first grade classrooms, designed and field tested a screening instrument. The instrument attempted to identify children 4 and 5 years of age early in the school year while having a high correlation with teacher referrals of children needing some type of special education service.

Procedures

The basic measurement used for the investigation of the screening device was frequency. Frequency is defined as counts per unit time. The counts were academic performances such as writing letters and numbers and saying names, words, and letters. The fixed time unit was 1 minute. The frequency score was the correct number of responses per minute. The consistent measurement plan insured complete reliability when counts were accurate. The staff of the project did the counting and timing to insure high reliability.

Children were individually screened on 5 consecutive days. Screening stations were manned by two project staff members in an area adjacent to the early education classroom. During the first day of screening, children received assistance in relational and directional concepts such as *alike* or *different* and *top* or *bottom*. The actual 1 minute timing of the task began when the child started the task rather than on the signal of "go" by the tester.

The selected population was based on children enrolled in an early education program within a lower socioeconomic area of the City of Baltimore. The population included children from three classrooms, 35 females and 30 males for a total of 65 children.

Table 1 includes the subtests that were used and the purpose of each subtest. Also included are descriptions of the materials used, task descriptions, and scoring.

The screening procedures were initiated in February, which was somewhat late in the school year. However, this was a pilot effort in preparation for the coming school year in the fall. Teachers' classification of their children into at risk and low risk categories was completed in May.

The most useful reference in the literature involving a frequency sampling procedure in early identification was the *State of Washington Screening Booklets* (Kunzelmann, 1972). Under this system several subtests are similar to their procedures: the X's in Circles, the See-Say Letters, the See-Say Numbers and the See-Write Letters. However, in the present study several changes were initiated. First, several subtests were added to reflect a younger population of pupils: Naming Pictures, Naming Number Sets, Color Matching and Hear-Touch (body parts). Secondly, to reduce the typical great variability of performance at this early age, children were tested individually on all subtests rather than including a mixture of group and individual sessions. Finally, subtests were eliminated

from consideration that did not have immediate curricular implications of performance for the child.

Rationale for Subtest Selections

Subtest design was based on several factors. Measures were developed on the basis of their face validity to the immediate school environment in which the child functioned; that is, the content of the measure reflected an important curricular goal or performance skill that the child was expected to exhibit. The frequency score yielded the child's relative proficiency in the performance of each specific task. In addition, the visual, auditory, and kinesthetic modalities were all tapped in the design of various subtests. The first seven subtests were administered to the 3 and 4 year olds; all nine subtests were administered to the 5 year olds.

The first two subtests represented a measure of proficiency with the child's basic tool in the early education program, the primary pencil. The X's in Circles provided the opportunity to assess eye-hand coordination with the primary pencil within the spatial requirements of a small circle. In the second subtest, XO Pattern, the child's developing skill with

TABLE 1

Subtest Selections

Subtests	*Purpose*	*Task*	*Materials*	*Scoring*
X's in Circles	Test eye-hand coordination when using a pencil	Mark *X* in each circle	40 3/4 inch circles on grid	Total no. of *X*'s inside circles
XO Pattern	Test ability to produce and imitate a pattern	Continue *XO* pattern	Paper divided into 88 squares	Total no. of *X*'s and *O*'s in correct pattern
Counting Number Sets	Test ability to count	Count objects on each card	20 cards; Objects 1 to 10	Total no. of correct counts
See-Say Letters	Test ability to name letters	Name letters	Chart with upper and lower case letters (114)	Total no. of letters named
Matching Colors	Test ability to match colors	Match colored blocks to colored boxes	46 blocks and 6 matching boxes	Total no. of blocks matched
Naming Pictures	Test ability to name picture symbols of objects	Name pictures objects	77 pictures mounted on a chart	Total no. of pictures named
Hear-Touch (body parts)	Test auditory discrimination and locating body parts	Touch body parts named	Audiotape with 40 cues	Total no. of responses
See-Write Letters	Test ability to reproduce letters	Reproduce letters underneath samples	Paper with upper case letters	Total no. of letters copied
See-Say Numbers	Test ability to name numbers	Name random numbers from 1 to 20	78 numbers on a chart	Total no. of numbers named

Note: Time = 60 seconds.

the pencil was employed in the reproduction of patterns of visual stimuli. This subtest was included after behavioral analysis of the mainstream classroom revealed an increasing emphasis on the child's skill to reproduce visual patterns via the chalkboard, overhead projector, and practice worksheets.

Counting in sequence is viewed in many early childhood programs as a primary mathematics skill. Within this particular program, children also identified the counted objects as a set. In the Counting Number Sets subtest, a chart of objects and geometric shapes in sets of 1 to 10 was developed. The child was to count the number of objects or shapes on the card and specify the number in the set.

The names of the letters of the alphabet were emphasized as a preliminary activity to reading. In this school environment, both upper case and lower case letters were used. The See-Say Letters subtest measured the child's facility at naming upper and lower case letters from a chart.

Colors were an important learning task not only in simple discrimination of one color from another but also as cues to learning other instructional tasks. The Matching Colors subtest involved the matching of blocks of six different colors with a colored box of the same color. The child was not required to name the color.

A child's expressive language within any educational program is critical to most learning activities, especially prereading instruction. The Naming Pictures subtest was devised to measure a child's verbal facility in naming simple object drawings without any background to distract from the object. Special consideration was given to selecting objects for the drawings that were in high frequency use in the classrooms and appropriate to the children's background of experiences.

The last subtest administered to the 3 and 4 year olds was the Hear-Touch. In this subtest, a voice on a prerecorded tape named a part of the body every 1.5 seconds as the child listened and touched the correct part of the body. The specific body parts were derived from curricular objectives: head, ear, eye, nose, neck, shoulder, elbow, hand, waist, knee, ankle, and foot.

Two additional subtests were administered only to the 5 year olds. Both subtests reflect the cognitive emphasis of this specific curriculum on proficiency in letters and numbers. In the See-Write Letters, the child copied randomized alphabet letters (upper and lower case) in a box directly beneath the model letters. The last subtest was the See-Say Numbers. The child named randomized numbers from 1 to 20 from a number chart.

Results

Upon completion of the screening, a mean score was computed for the 5 days of frequency scores per each subtest yielding seven scores for 4 year olds and nine scores for 5 year olds.

The frequency scores for each subtest were ranked from highest to lowest score for each age group. Children were identified as at risk when three or more of the subtest scores fell below a certain cutoff level. Initially, three different cutoff levels were established. However, as shown in Table 2, the 25% cutoff level was verified later as possessing the highest predictive value. Applying the 25% criteria as the cutoff for ranked scores, 15 children were identified as possible at risk learners.

TABLE 2

Comparison of Three Cutoff Levels to Year End Teacher Identification of At Risk Children

Cutoff criteria	*Number of children identified*
37.5%	17 (13% overidentified)
25%	15 (1% underidentified)
10%	12 (8% underidentified)

Study of the cumulative records of the 65 children following the screening found that 8 of the 15 children identified by the screening instrument had already been referred for special instructional assistance by the classroom teacher. One child had been referred for assistance whose frequency scores were above the cutoff domain.

The issues raised from the research literature indicated predictive validity as the most critical outcome of an early identification procedure. Teacher judgment is cited as one of the most reliable means of identifying at risk children when teachers have sufficient time to observe their children (usually a minimum of 4 months or more). Predictive validity of an early identification procedure can be established, therefore, by comparing the results of

early identification screening with teacher judgment.

Near the completion of the school term (third week in May), the three classroom teachers participating in this study were interviewed. On the basis of their judgment, the 65 children were classified as either at risk or low risk for the upcoming school year. The teachers indicated that in addition to the 9 children previously referred, there were 7 other children who, in the teachers' opinions, could be classified as at risk. Using teacher judgment as the criteria for accuracy, Figure 1 summarizes the findings. At the 25% cutoff level, there is a high correlation between teacher judgment and identification through the frequency sampling technique as to the classification of 65 children into low risk or at risk categories.

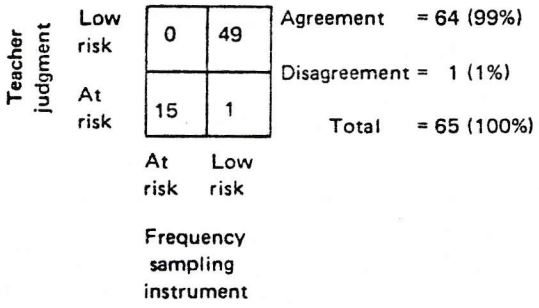

FIGURE 1. Comparison of identification by teacher judgment to results of instrument identification.

While the results of this screening are strong, it should be noted that only 65 children were included in this pilot study. The power of the screening device is questionably high. There is a need to repeat the procedures with a larger population.

Administration of High Predictive Subtests

Although subtests were designed to represent major instructional emphases and performance skills within the extant early education program, the nine subtests did not function equally well at discriminating at risk learners from low risk learners. In Table 3, the nine subtests are ranked by their predictive value. Each subtest's predictive value was established by correlating teachers' judgment of at risk learners at the end of the year with each child's position in the ranking of the mean scores per each subtest. A brief perusal of Table 3 indicates that the see-write subtest and see-say subtests seem to have the most predictive value.

There were a number of empirical findings that improved test administration reliability. First, administration of the subtests should be on an individual basis. It is generally agreed that children at this age level do not perform consistently in most testing situations. Factors such as attending to directions, on task behaviors, and motivation are school related skills beginning to develop during kindergarten and first grade; it is difficult to obtain reliable results in a group administration situation. To accommodate these developmental factors, three screening stations, with furniture suitable to the children's age, were used to test individual children.

Second, children should receive a practice session for all subtests on the first day of screening. It was found that some children needed assistance with making marks such as X or did not understand key directional and relational concepts used in the screening procedures.

Third, although children are started on the subtest with the traditional "Ready, get set, go" type of direction, timing should not begin until the child actually begins the task. This procedure makes the stopwatch a necessity during testing.

Careful preparation of subtest materials also insures reliable results. A packet of subtest materials for each child should be kept in a large envelope with a cover sheet stapled to the front to record identification data and all subtest scores for the 5 days of screening. Practice sheets may be covered with laminating material so that they are reusable; confusion of practice materials with scored materials is also prevented in this way. To design

TABLE 3

Ranking of Subtests by Highest Predictive Value

Subtest	*4 year olds*	*5 year olds*
X's in Circles	1	3
XO Pattern	2	2
Counting Number Sets	4	6
See-Say Letters	5	1
Matching Colors	3	4
Naming Pictures	6	8
Hear-Touch (body parts)	7	9
See-Write Letters	–	7
See-Say Numbers	–	5