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ABSTRACT

The Printing Performance School Readiness Test is an empirically derived instrument designed to aid in the early identification of preschool children who are at risk for school failure. The test is based on the outcome of a research program dealing with various aspects of children's printing that involved over 400 normal, non-repeating, native English-speaking children from lower and middle socio-economic backgrounds. The task requires children to print a series of letters and numbers from pictures that are presented to them one at a time on cards held in a spiral binder. Each child's resulting reproductions are then scored for certain errors, known as form errors, which predict with the same accuracy as many more time-consuming screening instruments. This manual contains information regarding (1) test materials, (2) administration procedures, (3) scoring procedures, (4) recommendations for using the test, (5) recommendations for early intervention, (6) summary, and (7) precautions. Sample characteristics, reliability, validity, and illustrations of test materials are included in the appendices. (Author/PN)

Printing Performance School Readiness Test:

Administration and Scoring Manual

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Introduction

The Printing Performance School Readiness Test (PPSRT) is an empirically derived instrument designed to aid in the early identification of preschool children who are at-risk for school failure. This test, developed over a four year period, is based on the outcome of an extensive research program dealing with various aspects of children's printing (Simner 1979, 1980a, 1980b, 1980c, 1981a, 1981b, 1981c, 1981d, 1981e, 1982a, 1982b, 1982c, 1982d, 1982e) that involved the participation of well over 400 normal, non-repeating, native English speaking children from lower and middle socio economic backgrounds. The task itself, described in detail below, requires children to print a series of letters and numbers from pictures that are presented to them one at a time on cards held in a spiral binder. Each child's resulting reproductions are then scored for certain errors, known as form errors, that our investigations have shown predict with the same accuracy as do many far more time consuming screening instruments, children's subsequent academic performance measured at the end of kindergarten as well as throughout Grade 1, not only in printing, but also in reading, writing, and in arithmetic. Evidence dealing with the predictive validity of these form errors along with a discussion comparing the overall predictive efficiency of this printing task with other school readiness instruments, can be found in Simner (1982a). Additional evidence that both replicates and extends the data reported in Simner (1982a) can be found in Appendix A of this Manual.

Since testing time requires approximately 10 minutes per child and individual protocols usually can be scored in less than 2-3 minutes, under normal circumstances, an entire kindergarten class of 30 children can be screened in 1-2 days. Also, because the PPSRT makes use of a simple printing task, most preschool children find this test non-threatening and even somewhat challenging. In addition, of course, since printing is a common exercise in kindergarten, familiarity with the nature of the errors that are scored in the PPSRT should alert teachers to be on the lookout for classroom mistakes having prognostic significance that would otherwise go unnoticed.

An extremely useful and unique feature of the PPSRT is the availability of cutoff points for school readiness, shown in Table 1 of this Manual, that are tied directly to the ultimate reference criterion of school performance itself. This unique feature resulted from the fact that, among other criteria measures, the PPSRT was validated directly against end-of-year promotion decisions and report card grades. Because of this particular criterion measure, Table 1 provides an easy way to convert the total number of form errors made by any given child into probability figures which show the actual odds of that child being at-risk for school failure. Of further importance, Table 1 also contains three separate sets of probability figures which correspond to the three time periods when screening for school readiness usually takes place. In general then, this means that the PPSRT can be used by teachers to help them identify failure prone children either at the time these children register for kindergarten (spring preceding kindergarten entry), when they enroll in kindergarten (fall semester of kindergarten), or before they leave kindergarten to enter Grade 1 (spring semester of kindergarten).

Test Materials

The kit includes (1) a spiral binder containing a series of cards with pictures of letters and numbers interspersed among an equal number of blank white cards, (2) a package of response sheets, (3) a package of scoring sheets, and (4) the administration and scoring manual. Illustrations showing these test materials can be found in Appendix B of this manual.

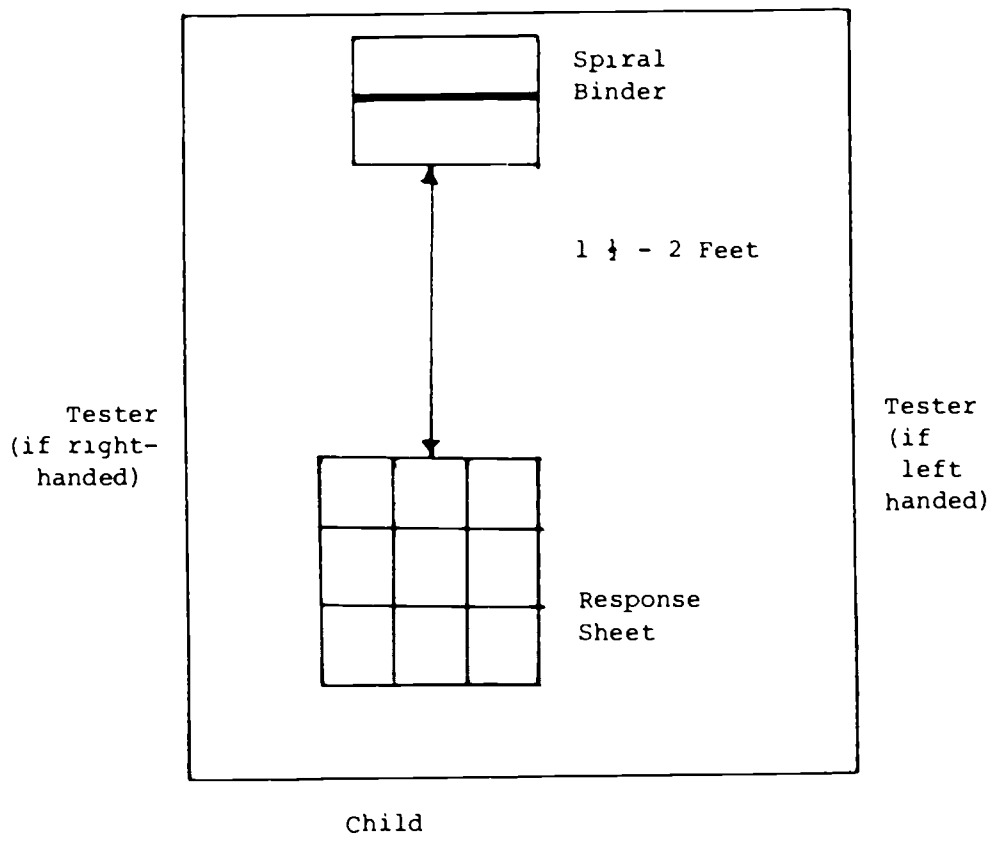
Administration Procedures

The procedures described below need to be followed as closely as possible since these procedures were used in standardizing the PPSRT. Any marked departure from these procedures could invalidate the cutoff points and probability figures shown in Table 1.

1) The test should be administered to one child at a time in a quiet room. Before testing, remove any pictures, drawings, or other objects from the area directly in front of the child that could prevent the child from concentrating on the task itself. This is very important since distracting influences are known to affect children's error scores.

2) The spiral binder should be opened to the first blank white card and fixed in position in the form of an easel facing the child.

3) The location of the spiral binder, the response sheet, the tester, and the child should closely approximate the layout shown below (see pg. 21 in Appendix B for an illustration of this layout):



4) When testing kindergarten children, please note that the task involves having these children print from memory immediately after a 2-3 second exposure to each of the letters and numbers in the spiral binder. Therefore, these children should not begin to print until after the card containing a letter or number is turned over and the next blank white card faces the child. This 2-3 second exposure period can easily be timed by counting silently 100, 200, 300 before each card is turned. The speed of counting should be practiced in advance, however, to ensure that the period of exposure closely approximates 2-3 seconds. If the period is either too short or too long this could affect the child's total error score. Pre-kindergarten children, on the other hand, should copy directly from the pictures of the letters and numbers while these pictures remain in full view.

5) Each response sheet is divided into 9 rectangular cells (see pg. 22 for an illustration of the response sheet). One letter or number should be printed in each cell of the response sheet, with the children being instructed, in advance, to start printing in the upper left-hand cell (cell #1) and to use the sequential order shown below as they print.

1	2	3
4	5	6
7	8	9

6) Since the spiral binder contains pictures of 41 letters and numbers, each child will need a total of five response sheets. Experience has shown that these five response sheets should be given to the child one at a time. This avoids the problem of having the child become distracted midway through testing by counting the number of response sheets that remain to be completed. After the child completes a response sheet, it should be removed and replaced with a new response sheet.

7) For kindergarten children, introduce the task by saying:

"I'm going to show you some pictures of letters and numbers on cards in this little book." (Point to the spiral binder.) "I'd like you to look very carefully at each card. After a little while I'm going to turn the card over so that you won't be able to see the letter or number any more. As soon as I do this, I'd like you to print or draw exactly what you saw on the card from your memory right here on this sheet of paper." (Point to the response sheet.) "Print or draw the first letter here in this space (point to cell #1), put the next one here in this space (point to cell #2), the next one goes here (point to cell #3), and so on all the way down to the bottom of the page. O.K.?" (Pause briefly to answer any questions.)

The next statement should be made in a friendly and positive manner to ensure the child that you have confidence in his/her ability to perform the printing task.

"I know this won't be hard for you to do because you have a very good memory. Remember though, you have to look very carefully at each picture so that you don't make any mistakes. Also, remember, don't print or draw until after I turn the card over and you can't see the picture anymore. Are you ready? O.K., let's start."

8) For pre-kindergarten children the same instructions should be used with the exception of omitting statements dealing with the child's memory. Instead of the foregoing, say:

"I'm going to show you some pictures of letters and numbers on cards in this little book. I'd like you to look very carefully at each card. Then I'd like you to print or draw exactly what you see on the card right here on this sheet of paper. Print or draw the first letter here in this space (point to cell #1), put the next one here in this space (point to cell #2), the next one goes here (point to cell #3), and so on all the way down to the bottom of the page. O.K.?

I know this won't be very hard for you to do. Remember, though, you have to look very carefully at each picture so that you don't make any mistakes. Are you ready? O.K., let's start."

9) Wait until the child is relaxed and comfortably seated before administering the test. On occasion children will be reluctant to start because they don't believe they can print very well. In most instances simply offering encouragement by re-emphasizing your confidence in the child's ability will be sufficient to overcome this problem. Such encouragement might also be required again during the course of testing and should be given when needed.

10) In part, the success of this task derives from the large number of letters and numbers the children are required to print since errors typically increase in frequency as the children proceed. Therefore, it is extremely important not to shorten the task by eliminating any letters or numbers. At the same time, however, it might be necessary on occasion to remind children of the initial instructions. Whenever a child's attention appears to be wandering repeat the following: "Remember, print or draw exactly what you saw on the card ...make your copy look just like the one on the card."

11) In order to maintain the child's interest, liberal praise should be given throughout testing as long as the child seems to be making an effort. When praise is given, however, the child should be reminded once more to print or draw exactly what appeared on the card.

12) Experience has also shown that it is often necessary to remind kindergarten children not to print or draw until after the card with the letter or number is turned over. Saying "wait" while the child

is looking at the letter or number is usually sufficient to prevent impulsive printing. In some instances, however, it might even be necessary to cover the response sheet with your hand to keep a child from printing before the card is turned.

13) Whenever a kindergarten child pauses 5-10 seconds, instead of printing immediately after you turn the card over, say: "Print whatever you think you saw." If the child continues to hesitate, show the same card once more, again for 2-3 seconds, accompanied by the instruction: "Remember, look very closely at the card, then after I turn the card over, print or draw exactly what you saw from your memory." If the child continues to hesitate after this second exposure, say once more: "Print whatever you think you saw." If this also brings no response, go on to the next card. Score a complete omission of this type as a form error when tallying the child's responses.

14) On occasion, children will attempt to redraw a letter or number once they realize that they have made a mistake. When this happens only score the child's initial attempt even though this attempt might be incomplete. Also, if a child starts printing and then claims that he/she can't remember what the rest of the letter looked like, do not show the letter again to the child. Say instead: "Draw whatever else you think you saw on the card." If the child continues to hesitate, go on to the next card and score the child's initial attempt as a form error if it meets the criteria described below.

Scoring Procedures

Once the printing task is finished, place the five completed response sheets face up in a pile in the order in which they were completed together with one scoring sheet. The scoring sheet (see Appendix B, pg. 23) shows an exact copy of each of the original letters and numbers as they appear in the spiral binder. These are also presented in the same order in which they were administered to the child starting with the letter 'P' in the upper left corner. Therefore, by placing the scoring sheet next to the pile of response sheets, it is quite easy to proceed through the pile when transferring information from each of the separate response sheets to the scoring sheet. Use the spaces to the right of the letters and numbers on the scoring sheet to note any form errors that appear on the response sheets.

Based on the outcome of the research reported in Simner 1979, 1981b, and 1982a, the major distinction between a correct reproduction and a form error depends on whether the child's reproduction has added, deleted, and/or misaligned parts that distort the overall form of the original letter or number. Do not count as form errors, for example, reproductions that differ from the original only in terms of orientation cues, such as left-right reversals (b ⟷ d). Printing errors of this type do not relate to children's readiness for school (Simner 1981b, 1982a). Figure 1 provides examples of reproductions made by pre-kindergarten and kindergarten children that were scored correct as well as examples that were scored as form errors. By referring to the pictures of the original letters and numbers shown on the scoring sheet, as well

as to the examples of correct reproductions and to the examples of form errors given in Figure 1, it is usually quite easy to determine which of the child's reproductions should be counted as form errors.

It needs to be kept in mind that since young children are often imprecise when printing, the examples in Figure 1 are provided only as a guide to illustrate something of the range of both correct reproductions and form errors that can be expected. Many other variations will, of course, appear on the response sheets. In cases of uncertainty, the following specific criteria should be used when scoring for the presence of form errors:

1) Slight overruns often take place when children connect two or more lines in a letter. These are not considered errors. However, when an overrun exceeds ¼ of the true length of the line, a form error should be scored. The following examples show common overruns designated as form errors. (In these, as well as in each of the illustrations that follow, the first letter is shown as it appears in the spiral binder. The child's reproduction to the right of the arrow represents a typical form error: E → , b → , b → , u → .)

2) A form error is scored when a child leaves a space between two normally connected parts in a letter (b → , R → , K →).

3) Letters having curved lines that are drawn straight (r →  , J →  , D → ) or straight lines that are drawn curved (E →  ,] →) count as form errors. Minor variations from normally curved or normally straight lines, however, should not be scored as form errors.

4) In the case of letters with several connected loops, if a space occurs between the loops that equals or exceeds the width of one of the loops, this should be considered a form error (B →  , m →  , 3 → ).

5) For letters such as b, d, g, h, etc. where straight lines are attached to curved lines at the periphery, if the straight line clearly intersects the curve (b →  , g → ) or fails to appear at the periphery (h →  , u → ), consider this a form error.

6) Retraced letters (S →  , m →) should <u>not</u> be counted as form errors if the end product closely resembles the original letter itself.

7) In the case of letters such as h, n, m, u, etc., if the separation between the normally vertical line and the remaining portion of the letter is greater than 35°, count this as a form error (h →  , u → ).

8) Reproductions of letters containing two intersection lines that are perpendicular (or nearly perpendicular) to each other, should be treated as form errors if the angle separating these two normally perpendicular lines is less than 20° (y ⟶  , L ⟶  , 7 ⟶ ).

9) It should be noted that as long as any of the form errors described above are present, regardless of the orientation of the child's reproduction, the reproduction should be scored as a form error.

10) Remember, also, that whenever a child completely omits a letter this, too, should be counted as a form error. In addition, remember to score only initial attempts at printing (see point #14 on page 6).

For each reproduction on the child's response sheet judged to be a form error, place a check (✓) in the space to the right of the corresponding letter or number on the scoring sheet. After all five completed response sheets have been scored in this way, the total number of checks should be added and recorded at the top of the scoring sheet. Next, compare this number against the form error scores in Table 1 under the column corresponding to the time period when the test was administered (either the spring preceding kindergarten entry, the fall semester of kindergarten, or the spring semester of kindergarten). Any child whose total form error score equals or exceeds the cutoff point in Table 1 is designated as being at-risk for failure (see Simner (1982a) for a discussion regarding the origin of these cutoff points).

When referring to Table 1, it is important to keep in mind that these cutoff points were established using native English speaking children of normal school entry age, that is, children whose 5th birthday falls between January 1 and December 31 of the year the child enters kindergarten. Hence, these cutoff points might not be valid if used in the case of children who are entering kindergarten at younger or older ages, or in the case of non-native English speaking children.

As mentioned above, Table 1 shows the cutoff points as well as the probability figures, or odds, associated with being at-risk for school failure (see Stanley (1965, pg. 101-102) for the procedures used in determining these probability figures). Take, for example, the case of a child of normal school entry age who is tested in the fall semester of kindergarten. If this child obtained a total form error score of 35, the odds are approximately 9 to 1 that this child will be in the bottom 20% as opposed to being in the top third of his class at the end of the school year. Hence, in the case of this child, the child is not only at-risk for school failure, but the odds of being at-risk are fairly high. These at-risk odds should also be recorded in the appropriate space on the scoring sheet. The use of this additional information is discussed below.

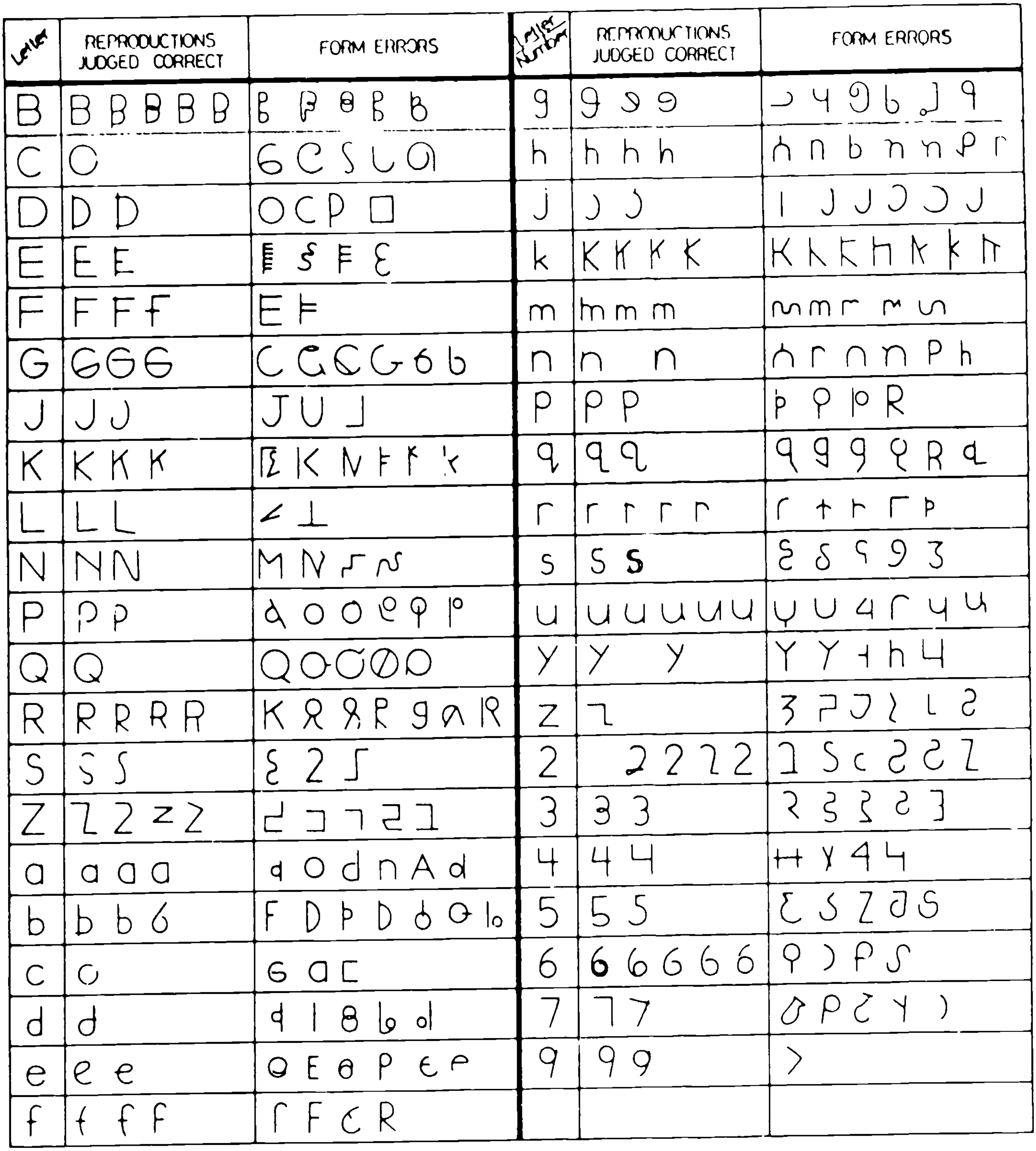
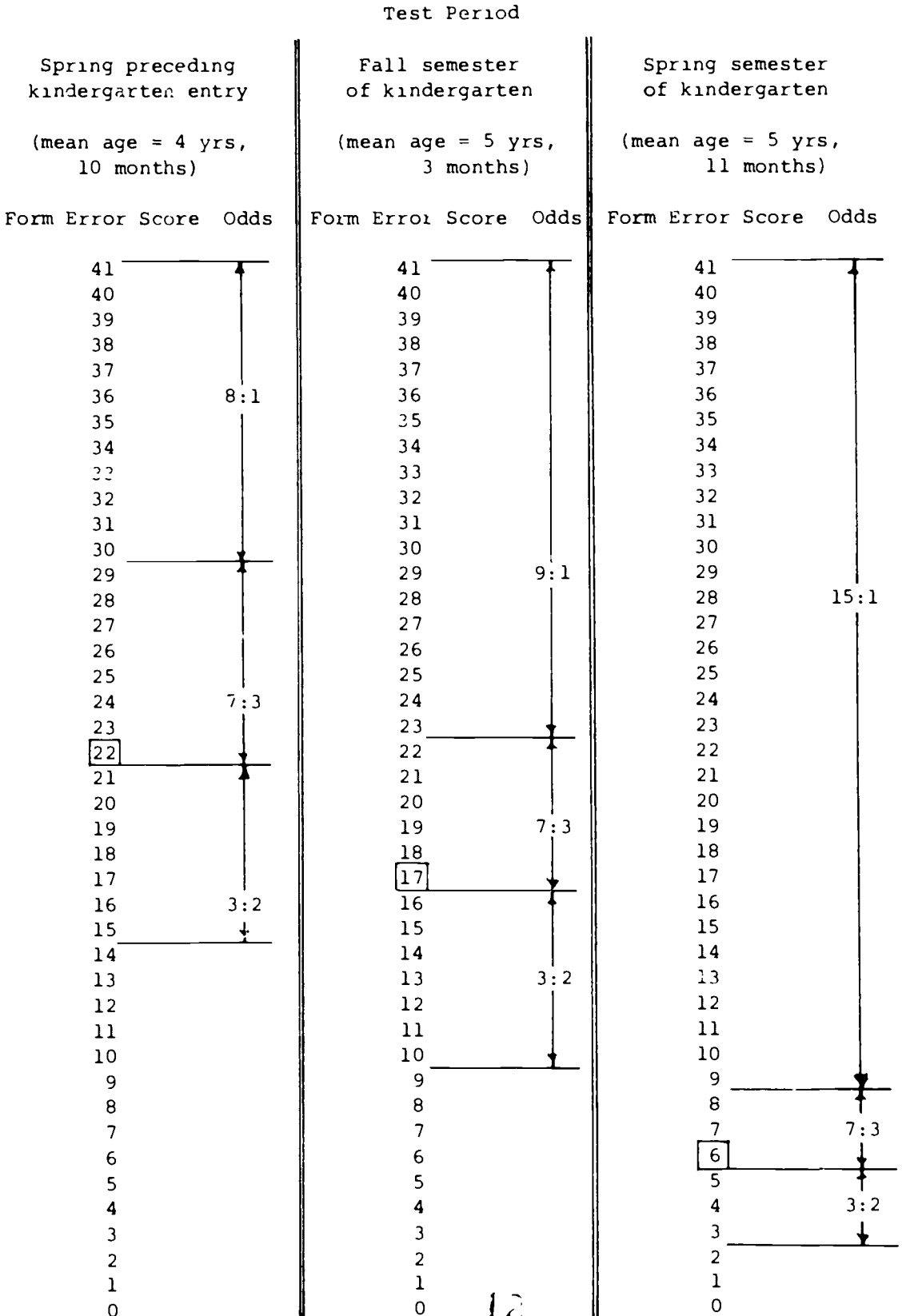


Figure 1. Examples of reproductions made by pre-kindergarten and kindergarten children that were judged correct as well as examples that were scored as form errors. This figure, which appeared on page 156 in Simner (1982a), is reproduced with permission granted by the Editor-in-Chief of the Journal of Learning Disabilities.

Table 1. Form error cutoff points (the numbers enclosed in boxes) and the approximate odds of a child being at-risk for school failure as opposed to being in the top third of the class, for children tested in (1) the spring preceding kindergarten entry, (2) the fall semester of kindergarten, and (3) the spring semester of kindergarten.



Recommendations for using the Printing Performance School Readiness Test

Based on the findings reported in Simner (1982a), the cutoff points shown in Table 1 were set at values that permit the identification of approximately 3/4 of those children who are likely to be in need of early assistance before they enter Grade 1 (true positives). As is the case with all screening devices, however, some children whose performance equals or exceeds the cutoff points in Table 1 will not be at-risk for failure (false positives). Section 2 in Appendix A, concerned with the predictive efficiency of the PPSRT, shows the percentage of true and false positives obtained using the cutoff points given in Table 1. While it is certainly the case that the percentage of false positives can be reduced by raising the cutoff points themselves, such a reduction is only accomplished at the expense of lowering the percentage of true positives. In other words, if this is done, many of the children who are in need of early assistance are likely to be missed. Therefore, it is important to keep in mind that these specific cutoff points were chosen because they lead to the best combination of true and false positives that can be expected with a screening instrument of this type.

Because of the likelihood of false positives, however, it is also important to take into account the odds of a child being at-risk for failure in addition to simply noting whether or not a given child performs at or above the cutoff point. The greatest majority of false positives occur as the odds of being at-risk decrease. Moreover, the greater the odds of being at-risk for failure, the greater the need to provide early assistance before the child enters Grade 1.

Given these considerations, we recommend using the PPSRT as the first stage in a two stage screening program. The following steps show how to implement this two stage approach to the early identification of children who are at-risk for school failure.

1) After administering the PPSRT to all of the children destined for screening, identify those children whose performance equals or exceeds the cutoff points in Table 1.

2) In the case of children for whom the at-risk odds are 8:1 or better, intervention should begin as soon as possible. This recommendation is based on evidence, gathered over a four year period, showing that approximately 80% of these children will either fail or will be performing very near the bottom of their class by the end of the school year. The remaining children in this subgroup who do not actually need early assistance (false positives) will usually become evident to the teacher during the instructional sessions in the intervention program itself. Here, the teacher should be on the lookout for behaviours such as (a) the ability to retain information and follow directions given in class, (b) the use of precise words and the ability to convey abstractions, (c) superior memory for details and content of story items, and (d) the tendency to think carefully before taking action or giving an answer. Research has shown that children who, in the kindergarten teacher's judgement, are doing well in these areas by the middle of kindergarten, are likely to

do well in 1st and 2nd grade (Stevenson, et. al. 1976).

3) In the case of the remaining children who were screened initially and whose performance equals or exceeds the cutoff point but for whom the at-risk odds are 7:3, further testing should be undertaken either at the time of registration or shortly after these children start kindergarten or 1st grade. The aim of this additional testing, in the case of this sub-group, is to isolate those children who are indeed at-risk for failure (true positives) from the group of children who are not at-risk for failure (false positives) before making any recommendations regarding early intervention. Here, more specialized instruments such as the Metropolitan Readiness Assessment Program, the Wechsler Preschool and Primary Scale of Intelligence, or the Stanford Early School Achievement Test, to name just a few, might be employed.

A number of advantages can be obtained by using this two stage approach to screening. First, because the PPSRT by itself provides the teacher or the public health nurse with a rapid way of identifying, at the start of the school year, those at-risk children who are most in need of academic assistance (children for whom the at-risk odds are 8:1 or better), a proper intervention program can be implemented long before these children begin to develop serious academic problems. Second, by utilizing further tests in the case of those remaining at-risk children who are performing at or near the cutoff point (those for whom the odds are 7:3), the likelihood of labeling any given child as being at-risk for failure when, in fact, that child is not at-risk for failure, can be greatly reduced (for evidence bearing on the problems associated with mislabeling see, for example, Rosenthal & Jacobsen, 1966).

The third advantage of this two stage approach to screening is that it avoids the need for having to use other more specialized and often extremely time consuming instruments on a wide scale basis in order to identify those few children in class who are truly in need of early assistance. For example, the Metropolitan Readiness Assessment Program, which at present is one of the most popular early screening devices (Maitland, Nadeau, & Nadeau 1974), requires 7-8 separate testing sessions to administer. This means that if the Metropolitan were to be given for general screening purposes, it would take approximately 6-8 days to test an entire kindergarten class of 30 children. With the PPSRT, however, such widescale screening can be accomplished in 1-2 days. Moreover, once those children whose form error scores exceed the cutoff point have been identified through use of the PPSRT, the Metropolitan could then be confined to the small sub-group whose at-risk odds are 7:3. In other words, by following this two stage procedure, use of tests such as the Metropolitan could be restricted to the 4 or 5 children, out of a class of 30 children, where the need for more specialized screening is greatest. Therefore, the third advantage gained by administering the PPSRT first, followed by subsequent testing on a more limited basis, is that it can reduce substantially the total amount of time that would normally be devoted to the screening process itself thereby improving the overall cost effectiveness of any early identification program.

Recommendations for Early Intervention

What kind of assistance should be offered to the at-risk children identified by the PPSRT? In the majority of cases, children who make a sufficient number of form errors to exceed the cutoff points shown in Table 1, do not suffer from perceptual problems, motor problems, or perceptual/motor integration problems as might be expected. Instead, the outcome of a series of investigations (Simner 1979, 1982a, 1982b, 1982c) using this printing task, has shown that these form errors are associated with at least two major factors: (1) lack of familiarity with letters and numbers, and (2) a short attention span. Hence, intervention programs such as those developed by Berry, Fernald, Frostig, Kephart and others which emphasize perceptual/motor training are not recommended. Instead, we recommend using an intervention program that is designed both to focus and maintain the child's attention throughout the course of instruction, while at the same time providing the child with increased drill in language based materials. The Direct Instructional Model described by Becker and Englemann (1978) is one example of such a program that has met with success and can be used in cases where a child has a short attention span and requires instruction in pre-reading and pre-math skills, in other words, the type of children that our results have shown perform poorly on the PPSRT. References to other at-risk prevention programs of a similar nature can be found in Miller & Dyer (1975). In general, these programs typically involve working with children in very small groups or individually, the careful sequencing of tasks, an emphasis on academic content, and the use of reinforcement as a means of instilling certain behaviours. The specific guidelines contained in these references should be consulted, however, before attempting to develop a teaching approach suitable to the needs of the at-risk children identified by this test.

Summary

The following six steps highlight the major points discussed above. Although these steps clearly illustrate the simplicity of the PPSRT as a screening device for school readiness, before putting these steps into practice, the examiner should become familiar with all of the information in the Administration and Scoring sections of this Manual.

Step #1. Arrange the test materials in a manner that closely approximates the layout shown on pages 3 and 21 in this Manual.

Step #2. When testing kindergarten children, make certain the children print from memory immediately after a 2-3 second exposure to each of the letters and numbers in the spiral binder.

When testing pre-kindergarten children, each child should copy the letters and numbers directly from the pictures in the spiral binder.

Step #3. After the children finish the test, score the five completed response sheets obtained from each child for the presence of form errors.

Step #4. Compare each child's total form error score with the form error score values shown in Table 1 using the column of values that correspond with the time period when the test was administered.

Step #5. For those children whose total form error score equals or exceeds the cutoff point in Table 1, record the odds of being at-risk for school failure.

Step #6. If the at-risk odds are 8:1 or higher, an early intervention program should be established for that child as soon as possible.

If the at-risk odds are 7:3, re-test the child using a more extensive screening battery before establishing an early intervention program.

Precautions

When applying these six steps the examiner needs to keep in mind that the total score assigned to any given child, as well as the interpretation of that score, will depend to some extent on how closely all of the instructions stated in this Manual are followed. In other words, despite the care that we have taken in establishing the cutoff points shown in Table 1, there is always the possibility that different cutoff points might be more appropriate in different school districts. For example, it is not uncommon in the case of tests such as this one to find that scores assigned to individual children will vary somewhat as a function of testing conditions, personality of the tester, and even examiner scoring biases. With respect to this last point, Snyder, Snyder & Massong (1981) have shown that some examiners are consistently more liberal than others when judging the accuracy of children's reproductions even though the criteria for making such judgements are clearly stated in the instruction manual. Moreover, if screening is undertaken at time periods other than those shown in Table 1, the cutoff points in Table 1 might not apply due to changes in children's abilities that take place throughout the kindergarten year. Also, of course, different school districts might employ slightly different promotion criteria which, in turn, could affect the validity of our cutoff points since, as mentioned above, these points were generated in accordance with the promotion criteria used in the schools from which we obtained our samples of children.

For these reasons, despite an impression that might have been conveyed in the preceeding pages of this Manual, we do not recommend using the cutoff points in Table 1 as rigid standards for decision making. Instead, to achieve optimal benefits from this instrument, we suggest employing locally generated cutoff points that closely reflect conditions that actually exist in the school districts where screening itself will take place (see Salvia & Ysseldyke (1978, Chapt. 19) for further discussion on the need to obtain local norms in the special case of school readiness tests in general). This can be easily accomplished by noting, at the end of the 1st year in which the PPSRT is used, the scores of those children who either fail kindergarten or who are placed

in junior or slower sections of grade 1. In keeping with the methods used to establish the cutoff points in Table 1 (see page 11), these locally adjusted cutoff points should then be set at values that permit the identification of approximately 75% of these children. If it is not feasible to institute this procedure at the local level, then the specific cutoff points in Table 1 should only serve as general guidelines when reaching decisions that are likely to affect the subsequent treatment of individual children.

APPENDIX A

Sample Characteristics

The sample described below was obtained from seven different public elementary schools situated in lower and middle income areas of a medium size urban centre (population: 258,000). The children were all native English speaking and were in the appropriate grade for their age at the time they were tested.

a) Pre-kindergarten sample

i) tested in May and June preceding fall entry into kindergarten

ii) sample size = 80 (male = 39, female = 41)

iii) mean age = 4 years, 10 months

b) Fall kindergarten sample

i) tested in October and November of kindergarten

ii) sample size = 116 (male = 63, female = 53)

iii) mean age = 5 years, 3 months

c) Spring kindergarten sample

i) tested in May and June of kindergarten

ii) sample size = 176 (male = 91, female = 85)

iii) mean age = 5 years, 11 months

Statistical Findings

Further data using additional samples of children that replicate the findings reported below, along with the cutoff points in Table 1, can be found in Simner 1982a.

A) Reliability

1) test-retest:

i) fall of kindergarten (one month interval, N = 24):

$$r_{xy} = .87 \ (p < .01)$$

ii) spring of pre-kindergarten to fall of kindergarten (four month interval, N = 25):

$$r_{xy} = .83 \ (p < .01)$$

iii) fall of kindergarten to spring of kindergarten (eight month interval, N = 110):

$$r_{xy} = .73 \quad (p < .01)$$

2) interscorer:

$$r_{xy} = .97 \quad (N = 21, \; p < .01)$$

B) Validity

1) Correlational validity

a) Concurrent:

i) total number of form errors generated in the spring of pre-kindergarten and the children's rank order on the pre-kindergarten end-of-year promotion list (N = 80):

$$r_{xy} = .50 \quad (p < .01)$$

ii) total number of form errors generated in the spring of kindergarten and the children's rank order on the kindergarten end-of-year promotion list (N = 176):

$$r_{xy} = .59 \quad (p < .01)$$

iii) total number of form errors generated in the spring of kindergarten and the children's performance on the Metropolitan Readiness Test (N = 21):

$$r_{xy} = .59 \quad (p < .01)$$

b) Predictive:

i) total number of form errors generated in the fall of kindergarten and the children's rank order on the kindergarten end-of-year promotion list (eight month interval, N = 116):

$$r_{xy} = .55 \quad (p < .01)$$

ii) total number of form errors generated in the fall of kindergarten and the children's performance on the Metropolitan Readiness test at the end of kindergarten (eight month interval, N = 22):

$$r_{xy} = .58 \quad (p < .01)$$

iii) total number of form errors generated in the fall of kindergarten and the children's performance on the Woodcock Reading Mastery Test at the end of 1st grade (twenty month interval, N = 88):

$$r_{xy} = .51 \quad (p < .01)$$

iv) total number of form errors generated in the spring of kindergarten and the children's performance on the Woodcock Reading Mastery Test at the end of 1st grade (twelve month interval, N = 92):

$$r_{xy} = .50 \ (p < .01)$$

v) total number of form errors generated in the fall of kindergarten and the children's performance on the Keymath Diagnostic Arithmetic Test at the end of 1st grade (twenty month interval, N = 84):

$$r_{xy} = .58 \ (p < .01)$$

vi) total number of form errors generated in the spring of kindergarten and the children's performance on the Keymath Diagnostic Arithmetic Test at the end of 1st grade (twelve month interval, N = 88):

$$r_{xy} = .61 \ (p < .01)$$

vii) total number of form errors (converted to standard score values) generated in the fall or spring of kindergarten and end-of-1st grade report card marks in (mean interval:seventeen months, N = 70):

a) speaking (speaks clearly and audibly in small group situations)

$$r_{xy} = .53 \ (p < .01)$$

b) reading (using picture clues, context clues, phonics, and word structure to read with understanding)

$$r_{xy} = .52 \ (p < .01)$$

c) writing (creating one-sentence stories)

$$r_{xy} = .51 \ (p < .01)$$

d) printing (printing clearly and accurately)

$$r_{xy} = .52 \ (p < .01)$$

e) number meaning (counting objects, knowing the meaning of 2-digit numbers, recognizing coins, reading and writing to 100)

$$r_{xy} = .53 \ (p < .01)$$

f) number facts (knowing addition and subtraction facts to at least 6, telling time to the hour, knowing days and months)

$$r_{xy} = .47 \ (p < .01)$$

g) problem solving (solving oral one-step problems, measuring length, matching shapes)

$$r_{xy} = .47 \ (p < .01)$$

2) Predictive Efficiency

In each of the tables shown below, the cells contain both the number and percentage (in brackets) of children for whom either true or false positive as well as true or false negative judgements occurred. Also, in each case, the form error cutoff points are those used in Table 1. As mentioned above, further evidence validating these cutoff points can be found in Simner, 1982a.

Table 1. Prediction of pre-kindergarten teachers' end-of-year school readiness evaluations using the pre-kindergarten children's total number of form errors generated in the spring of pre-kindergarten.

	teacher's end-of-year readiness evaluations	
form error cutoff score	at risk for failure	top third of class
poor prognosis (22 or more errors)	(true positive) 8 (62%)	(false positive) 4 (14%)
good prognosis (less than 22 errors)	(false negative) 5 (38%)	(true negative) 24 (86%)

Classification hit rate: true positive + true negative/ total number of children for whom predictions were made = 78%.

Table 2. Prediction of kindergarten teachers' end-of-year school readiness evaluations using the kindergarten children's total number of form errors generated in the fall of kindergarten.

form error cutoff score	teacher's end-of-year readiness evaluations: at risk for failure	top third of class
poor prognosis (17 or more errors)	(true positive) 16 (76%)	(false positive) 7 (19%)
good prognosis (less than 17 errors)	(false negative) 5 (24%)	(true negative) 30 (81%)

Classification hit rate: true positive + true negative/ total number of children for whom predictions were made = 79%.

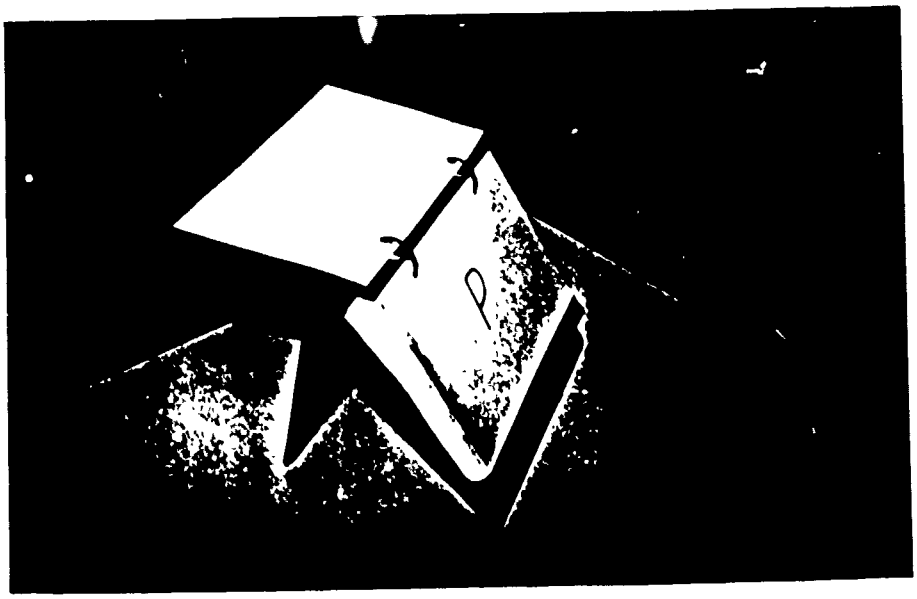
Table 3. Prediction of kindergarten teachers' end-of-year school readiness evaluations using the kindergarten children's total number of form errors generated in the spring of kindergarten.

form error cutoff score	teacher's end-of-year readiness evaluations: at risk for failure	top third of class
poor prognosis (6 or more errors)	(true positive) 32 (82%)	(false positive) 13 (22%)
good prognosis (less than 6 errors)	(false negative) 7 (18%)	(true negative) 45 (78%)

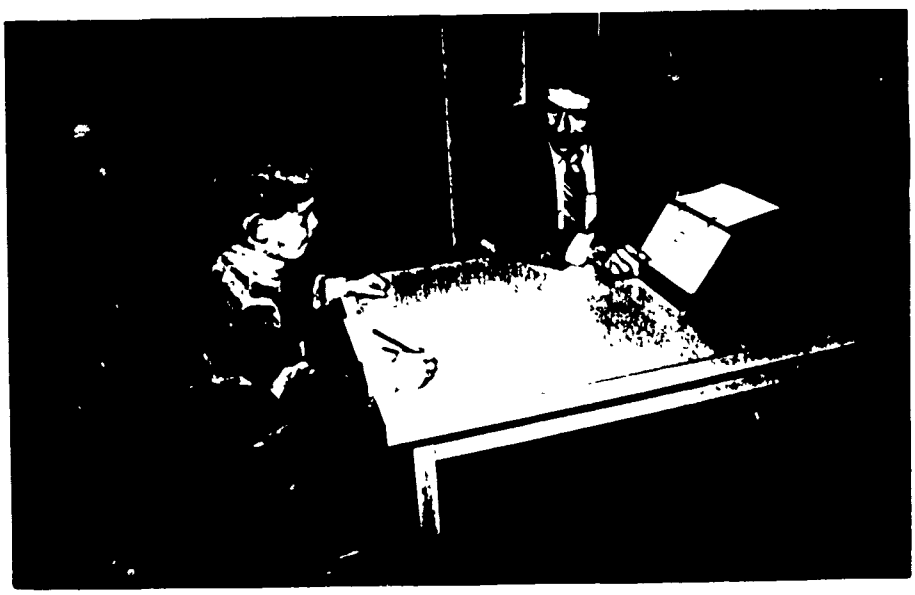
Classification hit rate: true positive + true negative/ total number of children for whom predictions were made = 79%.

APPENDIX B

Illustrations of test materials



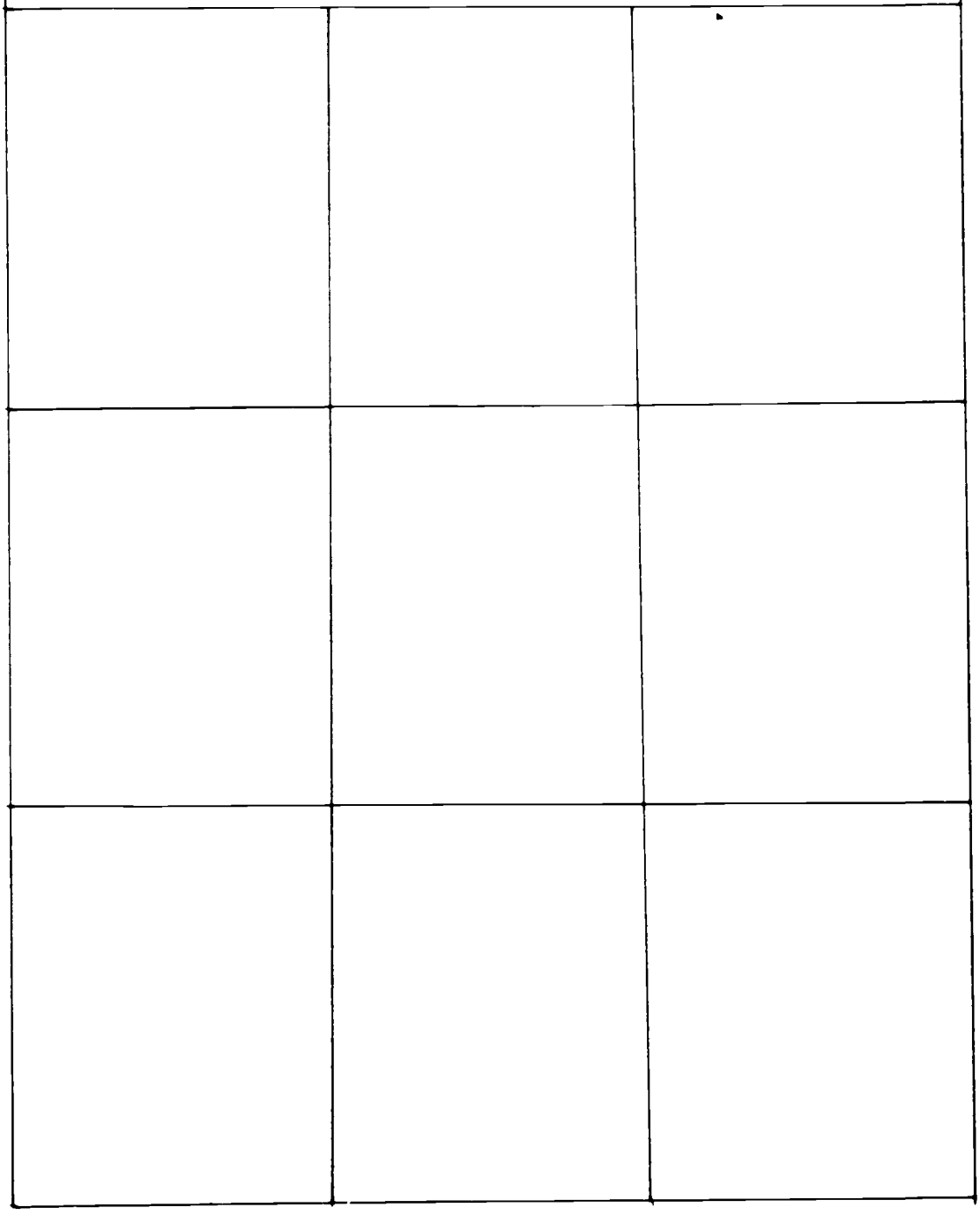
Spiral binder opened and fixed in position in the form of an easel.



Location of the spiral binder, response sheet, child, and tester during the administration of the Printing Performance School Readiness Test.

Name _____ Date _____

Grade _____



Response sheet used to record the children's reproductions during the administration of the Printing Performance School Readiness Test.

Name _____ School _____ Grade _____

Test Date _____ Total Number of Form Errors _____ At-Risk Odds _____

Response Sheet #1					
P		7		L	
6		J		Z	
B		h		a	
Response Sheet #2					
E		b		z	
m		P		R	
K		9		f	
Response Sheet #3					
Q		S		F	
2		r		d	
3		c		j	
Response Sheet #4					
N		C		G	
9		D		h	
Y		4		u	
Response Sheet #5					
e		5		k	
g		S			

Scoring sheet used to tally the number of form errors obtained on the five response sheets employed in the Printing Performance School Readiness Test.

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