Evaluation of a Full-Day Kindergarten Program
Y. Lawrence Wang and Whitcomb G. Johnstone

Many school districts are moving toward full-day kindergarten to accommodate the needs of working families, others maintain half-day kindergartens, or offer families a choice. When deciding what kind of kindergarten program to offer, educators must consider not only the desires of parents but also the potential effects on student achievement.

In this article, authors Y. Lawrence Wang and Whitcomb G. Johnstone investigate differences in oral language development, emergent literacy skills, mathematical reasoning and concepts, and behavior for full-day vs. half-day kindergarten students in the Irving (Texas) Independent School District. The study found some statistically significant advantages for the full-day kindergarten program and supported the school district’s decision to expand the full-day program.

In school year 1995-96, the Irving Independent School District piloted a full-day kindergarten program. As stated by Dr. Martha Stone, assistant superintendent for curriculum and instruction, two of the major objectives for full-day kindergarten are to:

1) help all kindergarten students reach a level of oral language development and literacy sufficient to be successful in first grade, and

2) decrease or eliminate the use of pre-first grade or any form of grade retention with students at the primary level.

In the long term, the district expects full-day kindergarten, in combination with other early intervention strategies, to contribute to stronger performance beyond the primary grade levels on state and national assessments.

Each school designed its own full-day kindergarten program. However, all of the programs subscribed to the following common objectives:

- improved oral language development;
- improved "emergent" reading skills;
- enhanced acquisition of early mathematics concepts, and
- improved appropriate behaviors.

This article discusses results of the second-year evaluation of the full-day kindergarten program, which was undertaken to help determine whether the district should expand the full-day program to more elementary schools. A major argument for full-day kindergarten is that additional hours in school would better prepare children for first grade and would result in a decreased need for grade retention, including pre-first, and fewer referrals to special education. Therefore, in this evaluation study, our research question is whether, given more hours of instruction, students in the full-day kindergarten program exhibit greater growth in oral language development, reading skills, mathematics concepts, and appropriate behaviors than students in the half-day program.

Design and Method

Participants—

This evaluation consisted of four parts. Each part investigated one of the four objectives of the full-day kindergarten program described above. A stratified

When this article was written, Y. Lawrence Wang was Measurement and Evaluation Specialist for the Department of Planning, Evaluation and Research of Irving Independent School District, Texas (enrollment 26,500). Whitcomb G. Johnstone is Director of the Department of Planning, Evaluation, and Research of Irving Independent School District.
random sampling strategy was applied so that all samples were drawn proportionately from each school for each analysis. This sampling strategy was used to balance the impacts of such factors as school effects or geographical (school cluster) effects.

All kindergartners who stayed in the same program throughout the pre- and post-assessment period were included in at least one of the four sub-studies. About half of the kindergartners in the district participated in the emergent literacy study, and the other half (45 classes) participated in the mathematics study. See Table 1 for the number of classes and students in each study.

Instruments—

**Oral Language Development.** We selected the IPT Oral Language Assessment (Ballard, Tighe, and Dalton 1991) as a pre- and post-measure of the students' oral language development. Because we wanted to assess the development of the language of instruction, students in the monolingual English classes were tested with the English version of the IPT and students in the bilingual classes were tested with the Spanish version (Ballard, Tighe, and Dalton 1989). Our experience with the IPT Oral Language Assessment in our first-year evaluation of the full-day kindergarten pilot demonstrated that raw score gains provide a more sensitive measure of development than change in language level.

**Mathematics Concepts.** The concepts and reasoning section of the Woodcock-McGrew Werder Mini-Battery of Achievement (MBA) (Woodcock, McGrew, and Werder 1994) was used as the measure of mathematics development. Because there was no Spanish MBA, the first 35 items were translated into Spanish locally for use with the bilingual group, with permission from the test publisher.

**Literacy Skills.** "An Observation Survey of Early Literacy Achievement" (Clay 1995) was used to assess emergent literacy in five skill areas: letter identification; word recognition; concepts of print; writing vocabulary; and recognizing sound in words. Students in the English group were tested using the English version of this instrument (Clay 1995), and bilingual students were tested using the Spanish version (Clay, et al. 1996).

**Behavior.** For this study, the social/emotional development checklist on the district's new kindergarten report card was used. There are eight facets of student behavior in the checklist: follows classroom/school rules, accepts responsibility for own actions, works well independently, works and plays well with others, uses time wisely, uses self-discipline, cares for property and materials, and participates in class activities.

At the end of each six-week period, teachers mark an "X" at the areas in which they feel improvement is needed. The sum of the number of marks for the first three six-week periods was computed as the first-semester score, and the marks for the remaining three six-week periods were combined as the second semester score. All scores were then translated into a four-point scale ranging from 0 to 3. In this way, students who received no check marks in any of the three six-week periods would receive three points, indicating the most positive level of at-school behavior. On the other hand, a "0" score would indicate the most negative level of behavior, and would be assigned to students who received check marks for all three reporting periods.

**Pre- and Post-Assessment—**

Teachers who were in the reading or the mathematics sub-study were instructed to complete the pre-assessments with all students in their designated classes by the end of October 1996. Post-assessments were completed by the next-to-last week of the school year in May 1997. A one-day substitute teacher was provided to assist the kindergarten teachers with the children as they completed these assessment in both semesters.

---

**Table 1.—The Number of Classes and Students Involved in Each Sub-Study**

<table>
<thead>
<tr>
<th>Program</th>
<th>Math Proficiency</th>
<th>Emergent Literacy</th>
<th>IPT Oral Language</th>
<th>Social Development</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Classes</td>
<td>Students*</td>
<td>Classes</td>
<td>Students*</td>
</tr>
<tr>
<td>Full-day K (Regular)</td>
<td>23</td>
<td>412</td>
<td>22</td>
<td>415</td>
</tr>
<tr>
<td>Half-day K (Regular)</td>
<td>12</td>
<td>143</td>
<td>11</td>
<td>135</td>
</tr>
<tr>
<td>Full-day K (Bilingual)</td>
<td>5</td>
<td>80</td>
<td>5</td>
<td>84</td>
</tr>
<tr>
<td>Half-day K (Bilingual)</td>
<td>7</td>
<td>45</td>
<td>7</td>
<td>101</td>
</tr>
</tbody>
</table>

*tested in both fall 1996 and spring 1997*
Under the coordination of Barbara Neal and Ron Robertson at the bilingual/ESL center, the pre-assessment of IPT Oral Language was accomplished by campus personnel with the assistance of bilingual/ESL assessment center staff during the second week of October. The post-assessment was accomplished in the same way about one week prior to the end of the school year.

Three weeks before the end of the school year, teachers in the behavior sample were instructed to send copies of the student report cards for all students in their classes to the planning, evaluation, and research office. Most of the report cards arrived at the office of planning, evaluation, and research by the end of the second-to-last week of the school year.

Findings

This study focused on one primary research question: "Does full-day kindergarten enhance students' oral language development, emergent reading skills, early mathematics reasoning, and appropriate behaviors to a greater level than a half-day program?" Our hypothesis, assuming similar curriculum and instruction, was that students in full-day kindergarten, with a longer instructional day, would show greater gains than students in half-day kindergarten on the IPT Oral Assessment, the emergent literacy observation forms, the MBA mathematics concepts and reasoning assessment, and the social emotional development checklist in the report card.

Oral Language Development

During the first six-week and the last six-week periods, IPT Oral Language Assessments were administered to assess students' oral language development. The total number of correct items was recorded at each assessment. A statistical procedure known as the repeated measures analysis of variance was performed on the scores. Only scores for the 564 students who stayed in the same program throughout the pre- and post-assessment period were included in the analysis. Results of the English-speaking and Spanish-speaking classes were analyzed separately.

Table 2 shows the mean pre-test and post-test scores on the IPT for English and Spanish-language students in each program districtwide; Figure 1 on page 30 shows gains for these groups from pre-test to post-test. Students in full-day group started and ended higher on the IPT than students in the half-day group. Both full-day and half-day students made progress in oral language development, but the full-day kindergarten students made greater gains, for both the English-speaking and the Spanish-speaking groups.

Mathematics Concepts and Reasoning

The Concepts and Reasoning Section of the mathematics test in the Mini-Battery of Achievement (MBA) was used to measure students' early mathematics concepts. This section consists of 50 items, distributed uniformly in respect to difficulty. A Spanish translation of the first 35 items was done locally with permission from the publisher.

Table 2.—Pre-test and Post-test Mean Raw Scores on the IPT Oral Language Assessment

<table>
<thead>
<tr>
<th></th>
<th>English</th>
<th>Spanish</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Half-day K</td>
<td>Full-day K</td>
</tr>
<tr>
<td>(n=148)</td>
<td>(n=308)</td>
<td></td>
</tr>
<tr>
<td>Pre-test</td>
<td>34.04</td>
<td>35.94</td>
</tr>
<tr>
<td>Post-test</td>
<td>47.88</td>
<td>51.91</td>
</tr>
<tr>
<td>Gains</td>
<td>13.85</td>
<td>15.97</td>
</tr>
</tbody>
</table>

Note: IPT Score Range= 0-83

Table 3 lists the mean pre-test and post-test raw scores on the MBA Concepts and Reasoning Test for English and Spanish groups. The analyses of the mean gains in mathematics concepts and reasoning for these groups are shown in Figure 2 on page 30.

Table 3.—Pre-test and Post-test Mean Raw Scores on the MBA Mathematics Reasoning and Concepts Test

<table>
<thead>
<tr>
<th></th>
<th>English</th>
<th>Spanish</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Half-day K</td>
<td>Full-day K</td>
</tr>
<tr>
<td>(n=143)</td>
<td>(n=412)</td>
<td></td>
</tr>
<tr>
<td>Pre-test</td>
<td>17.17</td>
<td>19.25</td>
</tr>
<tr>
<td>Post-test</td>
<td>22.48</td>
<td>25.36</td>
</tr>
<tr>
<td>Gains</td>
<td>5.33</td>
<td>6.11</td>
</tr>
</tbody>
</table>

Note: MBA Score Range=0-50; 0-35 in Spanish

Emergent Literacy Skills

Each of the five literacy observation surveys targets one particular facet of a child's emergent literacy skills: letter identification, word recognition, concepts of print, writing vocabulary, and recognizing sounds in words. To examine the kindergarten program's effect on overall literacy skills, a statistical technique known as factor analysis was applied to the five literacy observation scores. The results of the factor analysis indicated that these five literacy observation measures seemed to measure one general factor. On the basis of this finding, we created a composite "literacy" score based on the percentage of correct responses to all five literacy surveys and used it as an indicator of overall literacy growth.
Figure 1.—Pre-test and Post-test Gains on Kindergarten IPT Oral Language Assessment

Program Type

Half-day K English  Full-day K English  Half-day K Spanish  Full-day K Spanish

# Points Gained

0  5  10  15  20

Figure 2.—Pre-test and Post-test Mean Raw Score Gains on the MBA Mathematics Reasoning and Concepts Test (MBA Score Range=0-50; 0-35 in Spanish)

Program Type

Half-day K English  Full-day K English  Half-day K Spanish  Full-day K Spanish

# Points Gained

4.8  5  5.2  5.4  5.6  5.8  6  6.2

Figure 3.—Percent of Correct Item Response Gains on the Observation Survey of Early Literacy Achievement (Composite)

Program Type

Half-day K English  Full-day K English  Half-day K Spanish  Full-day K Spanish

% Gained

0%  15%  30%  45%
Table 4.—Percent of Correct Item Responses on the Observation Survey of Early Literacy Achievement (Composite)

<table>
<thead>
<tr>
<th></th>
<th>English</th>
<th></th>
<th>Spanish</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Half-day K</td>
<td>Full-day K</td>
<td>Half-day K</td>
<td>Full-day K</td>
</tr>
<tr>
<td>Pre-test</td>
<td>(n=121)</td>
<td>(n=378)</td>
<td>(n=51)</td>
<td>(n=81)</td>
</tr>
<tr>
<td></td>
<td>31%</td>
<td>30%</td>
<td>12%</td>
<td>14%</td>
</tr>
<tr>
<td>Post-test</td>
<td>64%</td>
<td>70%</td>
<td>45%</td>
<td>49%</td>
</tr>
<tr>
<td>Gains</td>
<td>33%</td>
<td>40%</td>
<td>33%</td>
<td>35%</td>
</tr>
</tbody>
</table>

Table 5.—Mean Scores on the Irving ISD Report Card Social/Emotional Developmental Checklist (Composite)

<table>
<thead>
<tr>
<th></th>
<th>English</th>
<th></th>
<th>Spanish</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Half-day K</td>
<td>Full-day K</td>
<td>Half-day K</td>
<td>Full-day K</td>
</tr>
<tr>
<td>Pre-test</td>
<td>(n=51)</td>
<td>(n=198)</td>
<td>(n=14)</td>
<td>(n=10)</td>
</tr>
<tr>
<td></td>
<td>21.45</td>
<td>21.05</td>
<td>15.21</td>
<td>7.30</td>
</tr>
<tr>
<td>Post-test</td>
<td>21.55</td>
<td>22.09</td>
<td>18.29</td>
<td>11.20</td>
</tr>
<tr>
<td>Gains</td>
<td>0.10</td>
<td>1.04</td>
<td>3.08</td>
<td>3.90</td>
</tr>
</tbody>
</table>

Table 4 above displays the percentage of correct responses for half- and full-day English-speaking and bilingual classes. The mean gains on the composite emergent literacy scores for English-speaking and Spanish-speaking groups are displayed respectively in Figure 3 on page 30.

Figure 3 shows significant full-day versus half-day gains on the composite literacy score in favor of the full-day program in the English-speaking classes. However, there was no statistically significant difference in the Spanish-speaking full-day versus half-day comparison.

Social/Emotional Development—

The social and emotional checklist on the kindergarten student report card, which covers eight areas of school behavior, was used as a measure for student behaviors in this study. Our research question was whether the teachers in the full-day classes would rate their students as displaying fewer inappropriate behaviors than teachers in the half-day program.

The results of a factor analysis similar to the previous one for the literacy measures indicated that using one overall summary score for the eight social-emotional indicators was appropriate. These indicators were all on a 0 to 3-point scale in which a higher score represented better behavior. Summing the scores for all eight indicators would result in a possible highest score of 24. The average scores for both kindergarten groups on this overall behavior scale are displayed below in Table 5.

The gains for English-speaking and Spanish-speaking groups are shown in Figure 4 below, indicating that full-day students in both English-speaking and Spanish-speaking classes made greater gains than their half-day peers. No statistical analysis was applied to the behavior scores due to extreme skew in their distribution.

Summary and Conclusions

The findings of this second-year district-wide evaluation study of full- and half-day kindergarten programs basically coincide with the findings in the first-year pilot. The results of statistical analyses conducted for the English-speaking full-day versus half-day comparison in oral language development, early mathematics concepts, and emergent literacy skills all indicated significant differences in favor of full-day kindergarten. The analysis of pre-to post-test
ratings of school behavior also indicated that being in a full-day program tended to improve students' behaviors more than being in a half-day program.

The results of the same full- vs. half-day analyses for Spanish-speaking classes did not find as many statistically significant differences between these two groups of students. However, within the Spanish classes the analyses of the pre- to post-test differences still indicated that full-day students tended to make more improvement than half-day students in oral language, mathematics concepts, and emergent literacy.

The lack of statistical significance in the gains for the Spanish-speaking group may be a reflection of the smaller number of participants in that group compared to the English-speaking group. The pattern of gains between full- and half-day programs were similar for both groups.

Overall, the weight of the findings favor the full-day kindergarten program and support the decision to expand full-day kindergarten to all elementary schools in the Irving school district.

References


