# Appendix H.

# Do Teacher Aides Improve Student Performance?*

At the time that Tennessee's legislatively mandated study of class size (Project STAR) was being designed in 1985, the state had just begun to provide support for teacher aides in grades K through 3. The staff of the State Department of Education and the State Board of Education were interested in whether aides were effective in helping teachers to improve instruction and thus improve the performance of students, so Project STAR was designed to allow the evaluation of the effects of teacher aides, as well as small classes.

## Previous Research on Teacher Aides

There is extensive literature about the use of teacher aides and "assistant teachers" in classrooms. The major part of the literature is descriptive, indicating how aides were used and/or what they did, how they should be trained, and how teachers felt about them (Park, 1956; Howell et al., 1958; Bennett & Folk, 1968; Rasp & MacQuarrie, 1986; Johnson, 1987). The literature indicated teachers generally felt aides were helpful and that they enabled the teacher to spend more time on instruction and less on clerical and custodial activities (monitoring recess or lunchroom, for example). While a majority of teachers were positive about using aides and the ways they could be helpful, several studies indicated that a small percent of teachers were neutral or negative about them. Issues of training for aides and certification of aides were also themes in the literature.

A few studies attempted to assess the effect of aides on student achievement in the early elementary grades, using experimental or quasi experimental designs (Howell et al., 1958; Bennett, 1970; Holzmiller, 1982; Handley, 1986; Jackson et al., 1985; Johnson, 1988). Two studies found greater gains in student achievement in the classes with aides, while the other studies found either mixed results (some tests significant, others not) or no significant pupil gains in classes with aides. The previous research is positive on teacher reactions to aides and teachers beliefs that a teacher aide allows them to spend more time on instruction; it is inconclusive on whether an aide leads to higher student achievement.

## Data Collection About Teacher Aide Activities

For the teacher aides, information was obtained about their years of experience, their education, age, and sex. Teacher aides also completed a task checklist which listed 15 different activities and asked about the amount of time spent in each activity (i.e., taking attendance and doing reports and forms; working individually with special needs children; managing the whole class when the teacher is away). (See Appendix C for data collection instruments.) Teachers were also asked during their exit interviews how they used their aides and if they used them primarily in a clerical capacity or primarily as instructional assistants.

## The Use of Teacher Aides in Project STAR

A few school systems had provided teacher aides prior to the mid-1980s as a local decision, locally funded. The State began to provide a teacher aide for every 75 pupils in grades 1-3 in 1984 to help teachers with the increased paperwork involved in implementing the Basic Skills First program. Aides did not have to be certified or have college training or any specific educational background. They were employed primarily as clerical rather than instructional

assistants, but teachers were allowed to assign them a variety of tasks, such as tutoring individual children, preparing materials for class, filling out forms, and monitoring recess. There was no state salary schedule for aides and no special training programs for them. These were local responsibilities.

Decisions about who would be hired and what they would be paid as aides for Project STAR were made locally, consistent with the existing patterns of local responsibility for employment of aides. Most of the Project STAR aides received no special training in their duties, and teachers did not have any training in how to utilize an aide effectively. Fewer than a dozen of the kindergarten aides had written job descriptions; the aides' roles were worked out informally with the teacher. This led to substantial variation in the way aides were used in Project STAR.

A brief orientation manual for teachers and aides on the roles and responsibilities of aides was developed by the state and was adapted for use with the teachers and aides in Project STAR in first, second and third grade. Teachers and aides reviewed the manual at the beginning of each school year as a part of the Project STAR orientation program. In second and third grade a sub-sample of 17 teachers each year got training in working with an aide as a part of the special training program provided in STAR.

Project STAR followed the principle that participating schools should not reduce the services available to any student. In kindergarten, regular class teachers did not have the services of the Basic Skill First aides; this allowed the comparison of aide with no aide conditions. This was justified because the state did not provide aides for kindergarten, only for the first three grades. However, in grades 1, 2, and 3, the regular classes (and the small classes) were allowed to have the part-time services of an aide. Figure 1 shows the average number of days in the month that small, regular, and regular/aide classes used an aide for at least part of a day. The regular classes used aides on the average for nearly 18 days a month. Since typical use was part-time, the aide services to the regular classes are the equivalent of 25 to 33 percent of a full-time aide. Project STAR's basic comparison is between regular classes that have aide services for 25 to 33 percent of the time and similar sized classes that have a full-time aide. This reduced the regular/aide - regular comparison, but whether the effect of the reduction is proportional to the amount of aide time spent in regular classes cannot be determined.

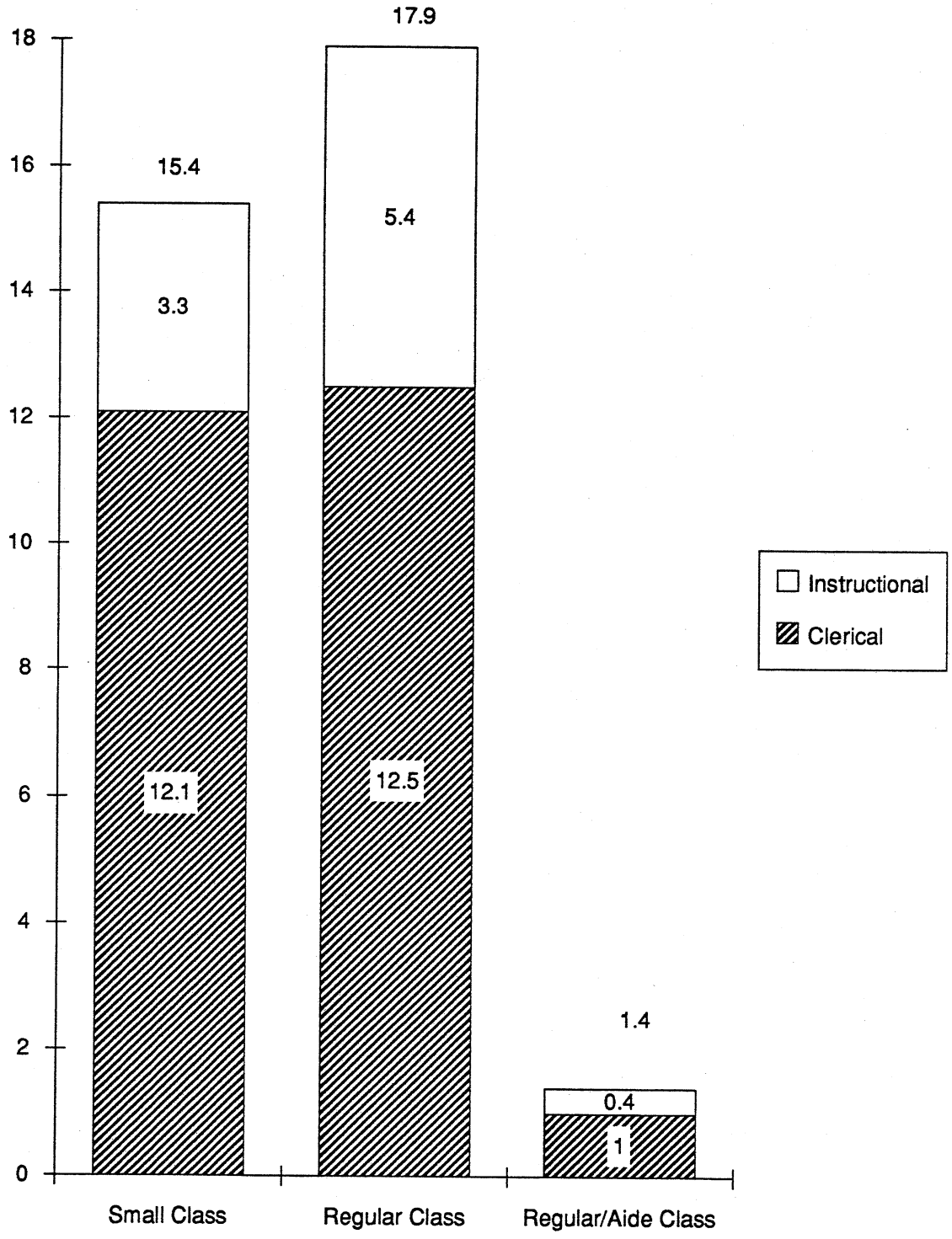
**Who were the Aides and What Did They Do?**

Aides had on the average about three years' experience as an aide. With the exception of one male aide in the third grade, they were all female; about 70 percent were white and 30 percent black. About 55 percent of the aides had only a high school education; another 37 percent had some college but no degree. Between 5 and 10 percent were college graduates, and between 5 and 8 percent had previously been teachers. Some of the aides at the top end of the education ladder were hoping to get the next teaching vacancy.

The salary varied by districts but averaged a little more than $7,000 a year. It is not surprising that about 60 percent of the aides listed salary as the least desirable aspect of their jobs in a questionnaire. Two-thirds said that working with children was the most attractive thing about their job. About 18 percent felt that the schedule was the most attractive part of the job, while teamwork with the teacher was a top choice for about 15 percent.

FIGURE H-1

Average Days of Usage of Basic Skills Aides Per Month by Class Type




A day of use is use for any part of the day.

Aides in the second and third grades responded to a questionnaire that asked them to identify how much time they spent on each of 16 different activities divided into three broad categories: custodial (e.g., supervising children at lunch); clerical (e.g., taking attendance, grading papers for the teacher); or instructional (e.g., tutoring individual children). The average amount of time per week spent in each area of activities was: custodial, 4.8 hours; clerical, 10.6 hours; instructional, 7.4 hours (see Table H-1). There is a large variance around these averages which is not surprising since teachers and aides worked out their schedules with very few guidelines.

## TABLE H-1

### Average Amount of Time Spent on Various Tasks By Project STAR 3rd Grade Aides

| Type of Activity | Mean Hours Per Week | Standard Deviation | % of Aides Doing |
|---|---|---|---|
| **Custodial** | 4.8 | 3.28 | 91% |
| Supervising recess | 0.6 | | 31% |
| Supervising lunch | 3.8 | | 84% |
| Other | 0.4 | | |
| **Clerical** | 10.6 | 5.02 | 100% |
| Preparing materials for lessons or learning centers | 2.3 | | 84% |
| Grading papers & tests | 7.1 | | 97% |
| Completing forms & reports | 1.2 | | 78% |
| **Instructional** | 7.4 | 5.10 | 90% |
| Tutoring individual children | 2.9 | | 72% |
| Working with special needs students | 1.8 | | 50% |
| Working with a reading or math group | 2.4 | | 70% |
| Teaching a lesson to the whole class | 0.2 | | 16% |

Approximately 1/4 of the 30-hour week was spent in other activity.

The project supplied general guidelines for aides in grades 1, 2, and 3. These provided that: 1) aides could not serve as substitute teachers; 2) aides were to work under the direct supervision of the teacher; and 3) aides were not to be used for more than one hour a day in duties outside the classroom (such as supervision of recess or lunch). The guidelines were advisory, not regulatory. For example, about 20 percent of the aides reported that they spent more than an hour a day in activities outside the classroom. The variation in aide activities provided an opportunity to see if differences in what the aide did had any effect on student learning.

### Teacher Preferences

In the year-end interview, teachers were asked whether they would prefer to have a small class or an aide as their regular teaching condition. Several teachers gave conditional responses such as, "It would depend on who the aide was." There was an overall preference for small classes rather than aides, but this depended partly on the teacher's own experience. Eighty percent of the teachers who had a small class preferred a small class and 56 percent of the teachers who had an aide would have preferred a small class. The teachers who had a regular class chose a small class 71 percent of the time. Data from third grade teachers' interviews showed that having an aide did seem to increase teachers' interest and enthusiasm for them.

### Effects of an Aide on Student Achievement

Students in regular/aide classes did not achieve at significantly higher levels than students in the regular classes in kindergarten or grades 2 and 3 (Table H-2). In grade 1, however, students in regular/aide classes did score significantly higher in both Total Reading and Math than did students in the regular classes. Scores in the subtests of Reading (Word Study, Reading Comprehension) and Math (Math Reasoning, Math Computation), and in Listening were similar in pattern and magnitude to the Total Reading and Total Math scores each year.

Aides were less effective than small classes in enhancing student performance at each grade level. The overall pattern of student achievement in small classes was for students in kindergarten to outperform the regular classes, and in first grade to outperform the regular classes by an even larger margin. Regular/aide classes had only slightly higher achievement scores than the regular classes in kindergarten, but had almost as large a gain in achievement in first grade as the small classes. After the first grade, the aide advantage over the regular classes got smaller; in some comparisons regular classes outperformed regular/aide classes (see Table H-3). The differences between aide and regular were slightly greater in reading than in math. This is what would be expected since almost twice as much time in grades 1 and 2 was spent in reading instruction as in math instruction.

## TABLE H-2

### Mean Scale Scores and Percentiles Stanford Achievement Test for Small, Regular/Aide, and Regular Classes for Reading and Math, by Grade

| | Scale Scores | | | Percentiles | | |
|---|---|---|---|---|---|---|
| Reading | Small | Regular | Regular /Aide | Small | Regular | Regular /Aide |
| Kindergarten | 440.5* | 434.2 | 435.8 | 59 | 52 | 53 |
| Grade 1 | 530.8* | 513.1 | 521.2* | 64 | 54 | 59 |
| Grade 2 | 590.7* | 578.9 | 583.1 | 62 | 52 | 56 |
| Grade 3 | 620.7* | 611.9 | 614.0 | 61 | 54 | 56 |
| Math | | | | | | |
| Kindergarten | 491.1* | 482.9 | 483.9 | 67 | 61 | 62 |
| Grade 1 | 539.0* | 525.2 | 529.9* | 59 | 47 | 51 |
| Grade 2 | 586.5* | 576.4 | 578.5 | 77 | 68 | 70 |
| Grade 3 | 622.8* | 615.0 | 616.2 | 75 | 69 | 69 |

Year-to-year comparisons of scaled scores can be made, but reading and math scaled scores cannot be compared directly. These means are based on the total number of students at each grade level who have test scores. For reading the n's are K=5126, One=5541, Two=5494, Three=5242. The number with math scores is 50 to 100 higher each year. Out-of-range classes (regular and aide class with n<21, small classes with n>17) have been excluded. The number of aide classes in the analysis K=83, One=91, Two=98, Three=99. (*P < .01)

Table H-3 also shows average gains for low and high SES students in regular/aide and regular classes. Since aides reported spending about a fourth of their "instructional" time working with special needs students, this might be expected to give low SES students an advantage in gain scores over low SES students in regular classes. In the first grade low SES students did gain more in regular/aide classes than low SES students in regular classes, but there was an insignificant gain for low SES students in regular/aide classes as compared with regular classes in second grade. In third grade the low SES regular classes had larger gain scores than the regular/aide classes. In second and third grades, the high SES students in regular classes had bigger gains than the high SES students in the aide classes. The case that an aide helps low SES students more than high SES students is a very weak one.

## TABLE H-3

### Mean Grade-to-Grade Gain Scores
### Stanford Achievement Test Reading and Math Scaled Scores
### Regular and Aide Classes
### Grades 1, 2 and 3

| Test and Grade | Total Group | | | High SES | | Low SES | |
|---|---|---|---|---|---|---|---|
| | Small | Regular | Regular /Aide | Regular | Regular /Aide | Regular | Regular /Aide |
| **Reading** | | | | | | | |
| Grade One | 91.6* | 79.4 | 89.0* | 93.3 | 101.3* | 62.7 | 74.4* |
| Grade Two | 57.0 | 58.4 | 59.4 | 57.9 | 56.6 | 58.1 | 62.3 |
| Grade Three | 26.6 | 28.2 | 27.1 | 25.7 | 24.5 | 31.7 | 30.3 |
| **Math** | | | | | | | |
| Grade One | 45.3* | 39.4 | 44.4* | 47.4 | 47.2 | 29.8 | 40.9* |
| Grade Two | 45.1 | 44.0 | 46.9 | 46.2 | 47.1 | 40.3 | 45.6 |
| Grade Three | 32.9 | 34.3 | 35.2 | 34. | 35. | 34. | 34.7 |

*p < .01 Aide Compared with Regular

Gain scores are the student's scaled score in spring of the year minus the scaled score in the spring of the previous year. Students who had scaled scores in both years and in-range classes were included. Total n's in reading were Grade 1 = 3577, Grade 2 = 4171, Grade 3 = 4094; n's in math were about 60-100 higher. Number of Regular/Aide Classes in the analysis were Grade 1 = 91, Grade 2 = 98, Grade 3 = 99

One theoretical reason for a class with an aide to outperform a class without one is that the aide can perform a number of routine tasks for the teacher, freeing the teacher to spend more time in direct instruction of the students. The aide effect is indirect, freeing the teacher to teach more.

In the year-end interviews teachers were asked if there was any difference in the amount of instructional time they spent: 60 percent of the teachers in regular classes reported they spent the same amount of time and 20 percent said they had more time; for the regular/aide aide classes 25 percent said they spent the same amount of time, and 71 percent said they spent more (third grade teacher responses). If the teacher perceptions were correct, and if the time on task research was valid, there should have been a substantial increase in student achievement in classes with an aide. Since an increase in student achievement was only found in first grade, teachers' beliefs that they had more time for instruction was not reflected in student achievement results.

Logs completed by the teachers, as well as the direct observations of a sample of about 20 percent of the teachers in grades 2 and 3, did not indicate that teachers with aides were

spending any more time in direct instruction of the students in either reading or math than in the regular classes. The teacher perceptions were not consistent with teacher logs or observation data. Unfortunately, there were no teacher observations in the first grade when regular/aide classes were outperforming the regular classes by the largest margins.

A second possible reason for a class with an aide to outperform a class without one is that the aide could have a direct effect on student learning, by teaching and tutoring students directly. Aides who spent more time in instruction and less in clerical work were hypothesized to have a positive effect on student learning. Since there self-reports of how aides spent their time, the percent of total time spent by aides in instruction can be related to class average achievement gains.

There was practically no correlation between the amount of time aides spent in custodial activities and student achievement in reading ($r = .01$) or math ($r = .01$). This is what would be expected. However, there was almost no correlation between aide time spent in instructional activities and achievement ($r = -.09$ for reading and $r = -.01$ for math). The amount of time spent in clerical activity also did not correlate highly with either reading achievement ($r= .07$) or math achievement ($r = .04$). There was no evidence that the kinds of things aides did, and/or the amount of time they spent doing them had any measurable effect on student achievement in either reading or math.*

**Training for Aides and Student Achievement**

Since school systems did not provide formal training for aides or for teachers in how to work with aides, it might be expected that special training for teachers and their aides would lead to more effective use of the aide, and subsequently, to improved student achievement. A three-day preschool in-service training program (which is described in another section of the report) was provided to a sample of 13 of the 79 schools in Project STAR for both second and third grade teachers. There were 17 aides and teachers involved in the training in second grade and 16 in the third grade. In the second grade, teachers worked with the aides for a half day on roles and mutual responsibilities and expectations. Some of the training focused on ways that aides could be most helpful to the instructional process, but the training was general in nature. In second grade, the teachers did not know whether they would be assigned to a class with an aide at the time they were trained. In the third grade the teachers had already been assigned to an aide class and their aides had a full day of training which covered roles and responsibilities and gave more attention to the ways that an aide could be helpful in the instructional process.

Training did not make a significant difference in the achievement of aide classes in either the second or the third grades (see Table H-4). Gain score comparisons adjust for any differences in the beginning achievement level of the students in the trained teacher classes as compared with the untrained teacher classes.

*Additional analyses were done of whether teacher's years of experience, position on the career ladder, or highest degree earned affected the way that they utilized their aides. None of these teacher characteristics were related to the way they assigned aides.

## TABLE H-4

### Effects of Training for Teachers and Aides on Student Achievement in Reading and Math Second and Third Grades (Scaled Score Gains)

| Test and Training Group | Grade 2 | Grade 3 |
|---|---|---|
| **Reading** | | |
| Trained | 64 | 26 |
| Untrained | 58 | 27 |
| **Math** | | |
| Trained | 46 | 32 |
| Untrained | 48 | 34 |

## Discussion

The primary conclusion from Project STAR is that aides who are selected locally, untrained, and assigned as general purpose assistants do not make a significant difference in student achievement. The first grade was an exception for which the analysis provided no ready explanation. The results from the other grades all show no difference in achievement in either reading or math between the regular/aide classes and the regular classes. Considering that regular classes had some aide assistance each year except in kindergarten, if a difference had been found in kindergarten and not in grade 1, there would be a ready explanation. The services of a part-time aide (24%-40 percent of the time) were as effective as the services of a full-time aide in boosting student achievement. But in kindergarten, where there were no aides in regular classes, the aides made no significant difference; and in grade 1, where achievement in regular/aide classes was about 10 percent higher than in regular classes, the regular classes had the part-time services of aides.

Lacking a good explanation of why an effect should be found in the first grade, and not in the other grades, there is a tendency to dismiss the finding as a chance happening rather than a real effect. There was also nearly no correlation between the amount of time the aide spent in working with special needs students or in individual tutoring, and class average achievement.

The aide effect (aide class minus regular class) found in grade 1 was not enhanced in grades 2 and 3, but actually decreased, so that by the end of grade 3 the students who were in the aide classes were only slightly ahead of the students in the regular classes. (See Table H-5) This decrease is not due to the entry of new students into the project; it also exists for the cohort of students who were with the project all four years.

## TABLE H-5

## Effect Size by Grade for Small Classes and Aide Classes in Reading and Math

| Test Subject and Comparison Groups | Kindergarten | Grade 1 | Grade 2 | Grade 3 |
|---|---|---|---|---|
| **Small and Regular*** | | | | |
| Total reading | .21 | .34 | .26 | .24 |
| Total math | .17 | .33 | .23 | .21 |
| **Regular/Aide - Regular**** | | | | |
| Total Reading | .05 | .15 | .11 | .05 |
| Total Math | .02 | .11 | .05 | .03 |

* Effect Size = Small-Regular/Standard Deviation of Regular

** Effect Size = Regular Aide - Regular/Standard Deviation of Regular

The aides appeared to have made more difference in reading instruction than in math instruction. Reading instruction in Project STAR made widespread use of reading groups, while math instruction was primarily whole class instruction. It seems reasonable that an aide could have been more useful to the instructional process when work is in small groups than when the teacher is working with the whole class.

Future research on aides' effects on student learning should be directed at ways in which their use might facilitate specific instructional processes and objectives. Based on Project STAR results, the addition of an aide into the classroom gave the teacher help with a lot of routines but doesn't seem to modify the way most teachers taught or the way that they organized instruction. Teachers felt less time pressure when they had an aide and felt that they devoted more time to instruction, but the objective evidence did not confirm that there was much change in time devoted to teaching. If the introduction of an aide was designed to achieve a specific objective (such as more work with "at risk" students) and the aide and the teacher were both trained in how the teacher and the aide could work together to achieve that objective, there might have been a different finding. The addition of a general purpose aide whose role was worked out with the teacher to meet the teacher's needs does not make much difference in student achievement even though teachers felt the aide helped them to devote more time to instruction by freeing them from clerical and custodial duties.