X. Summary

A. Introduction

Project STAR was designed to be a definitive study of the effects of class size and the use of a full-time teacher aide on student achievement in the early elementary grades. The study was successful in guarding against major threats to validity; teachers were randomly assigned, students were randomly assigned by the schools in accordance with instructions which were audited, and testing was monitored. Because there were 328-346 classes at each grade level, when small classes were too large, or large classes were too small, they could be excluded from the analysis. Most of the analyses was performed on 305-310 classes. No serious threats to the validity of the study's results that could not be dealt with by exclusion were discovered. While the results can only be generalized to Tennessee schools teaching the Tennessee curriculum, Tennessee schools and students do not differ that much from schools in other states.

Tennessee students score somewhat above the national norms on the Stanford Achievement Test. As studies have shown that students in almost all states score above the national norms, Tennessee students may be about "average" in their ability. A state-prescribed set of learning objectives, the Basic Skills First program, is taught in all primary grades. The dominant instructional methods were drill and practice. Whole class instruction was dominant in math, and reading instruction was primarily done in reading groups.

B. Summary of Achievement Results

1. Kindergarten Class Size Effect

STAR's kindergarten results showed definite advantage for small classes in achievement but no significant advantage for the use of a teacher aide. The overall superiority of the performance of students in small classes on the tests used in STAR and the similarity of performance of students in regular and regular/aide classes are shown graphically in Figures X-1 and X-2 which present SAT scaled scores and percentile ranks on Total Reading and Total Math by class type and by grade.

2. First Grade Class-Size Effect

At the end of first grade, Project STAR students in small classes were outperforming students in regular and in regular/aide classes by substantial (statistically and educationally significant) margins on standardized tests and also on the state's Basic Skills First (BSF) test of reading and math. Small-class students scored at the 64th percentile in reading and the 59th percentile in math at the end of the first grade, while students in regular classes scored at the 53rd percentile (11 points lower) in reading and at the 47th percentile (12 points lower) in math. Students in regular classes with a full-time teacher aide outperformed students in regular classes in both reading and math. The presence of a teacher aide in grade one benefits student achievement but not as much as the small-class condition.(See Figures X-1 and X-2.)

3. Second Grade Class-Size Effect

Students in small classes continued to outperform students in regular and regular with a full-time aide classes on all tests in the second grade. There were significant advantages for students in small classes on the SAT in Reading, Math, Listening, and Word Study Skills, and a similar advantage on the Tennessee BSF tests in Reading and Math.

Although students in regular/aide classes outperformed students in regular classes, the differences were not significant. Students in aide classes maintained their small achievement advantage over students in regular classes but did not increase their advantage. There is less consistency in the aide advantage than in the small-class advantage.

Figures X-1 and X-2 present the scaled SAT scores and percentiles on Total Reading and Total Math by class type. Due to similarity of results on all subtests, the summary results presented here are confined to Total Reading and Total Math.

4. Third Grade Class-Size Effect

By grade three the pattern of results established in kindergarten had become firmly fixed. A strong class-size effect is evident in all school locations (urban, rural, inner-city, and suburban) and for all students on standardized and criterion-referenced achievement measures. The SAT scaled scores and percentiles in each of the three class types in third grade are shown for Total Reading and Total Math in Figures X-1 and X-2. The consistency of the finding of the small-class effect across all measures is important. The absence of a statistically significant teacher aide effect is consistent.

5. Summary of the Principal Analyses, Grades K-3.

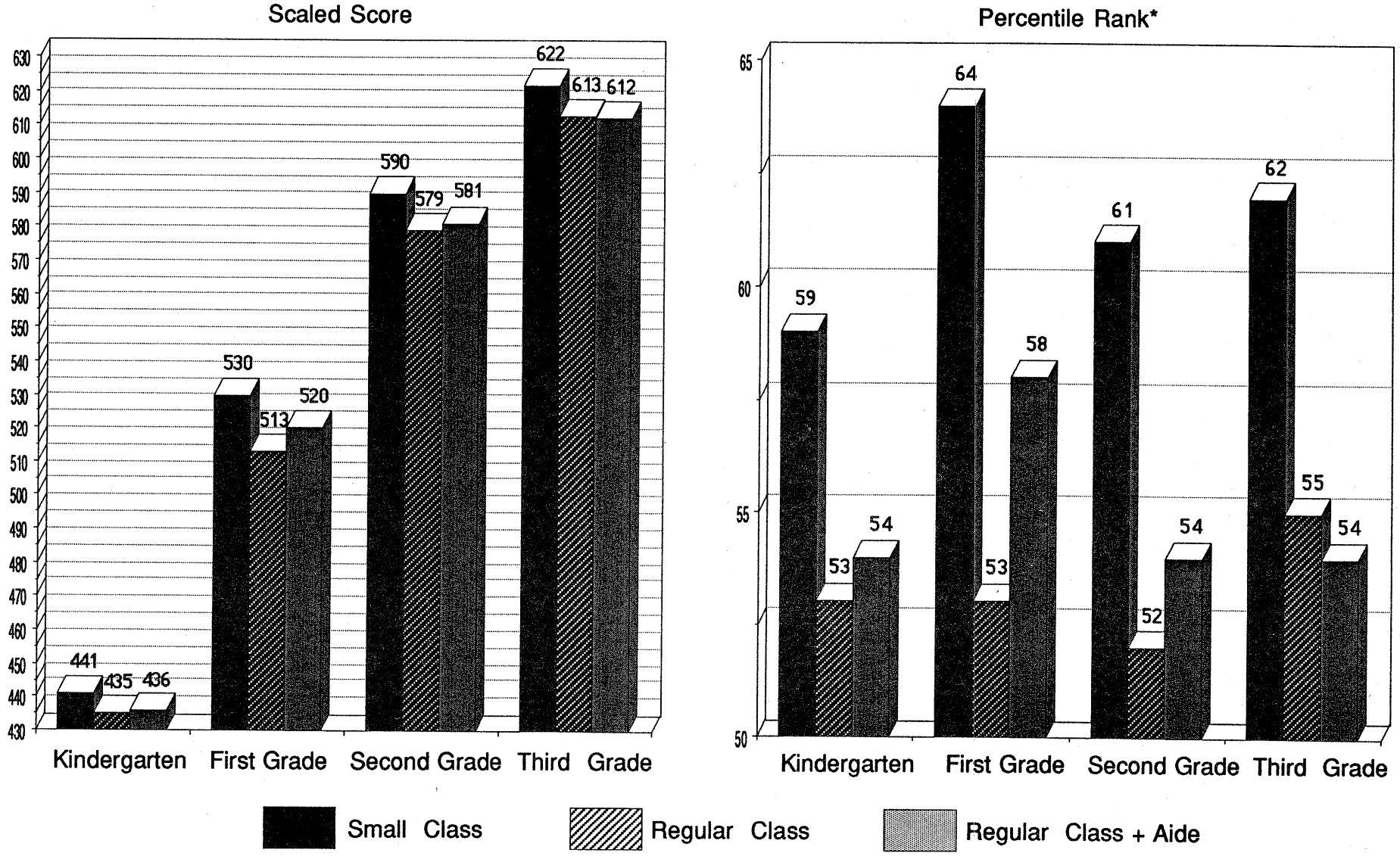
A comparison of results for grades K, 1, 2 and 3 provides a picture of routine consistency. The classes of inner-city students consistently score lower on achievement measures than classes in the other three locations. (Note that most minority students and students on free lunch were in the inner-city classes). The small-class effect is extremely strong (significant $p < .001$) in all contrasts. Students benefit from small classes wherever the small classes are located.

The effect of a regular class with a full-time teacher aide on student outcomes is less powerful and consistent. There is some benefit to being in a class with a teacher aide in grade one, but that effect loses significance in other grades. A summary of the analyses showing significance levels (.05, .01, .001) is in Table X-1.

Trained and untrained teachers did equally well across all class types and the (S) advantage (and absence of Aide effect) is found equally in all four locations for trained and untrained teachers. There was no training main effect, or training-by-type interaction.

The (S) advantage and all effects found for total class generally apply equally to white and minority students, especially in grade 2. The race difference was statistically significant for all measures and multivariate sets, but not for most interactions (LxR, TRxR, TxR, LxTxR, or TRxTxR).

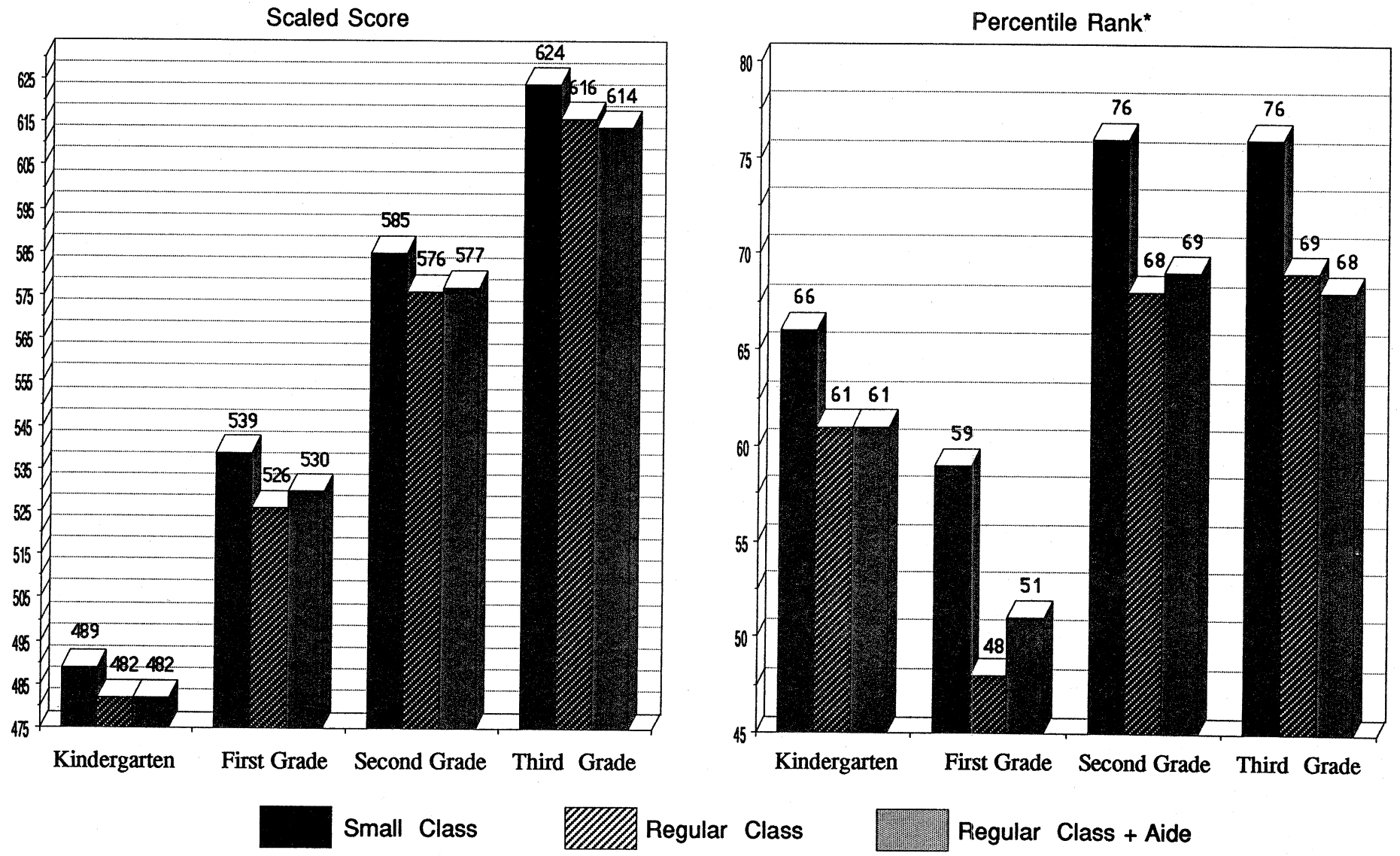
Figure X-1
Project STAR
Stanford Achievement Test
Total Reading: Class Type by Grade



Stanford SESAT II, Primary I, II, and III

*Percentile rank is based on Stanford Multilevel Norms

Figure X-2
Project STAR
Stanford Achievement Test
Total Math: Class Type by Grade



Stanford SESAT II, Primary I, II, and III

*Percentile rank is based on Stanford Multilevel Norms

TABLE X-1

Analysis of Variance for Cognitive Outcomes, STAR, Grades 1, 2, & 3 (preliminary), Sig. Levels p<=.05 or greater are Tabled. (All levels are <=.)

Effect/[a] Grade		Reading			Mathematics		
		Multi-variate[b]	SAT Read	BSF Read	Multi-variate[b]	SAT Math	BSF Math
Location (L)	K	.01	.02	N/A	.01	.05	N/A
	1	.01	.06		.05		
	2	.001	.001	.001		.001	.001
	3	.001	.001	.001	.001	.001	.001
Race (R)	1	.001	.001	.001	.001	.001	.001
	2	.001	.001	.001	.001	.001	.001
Type (T)	K	.05	.001	N/A	.05	.02	N/A
	1	.001	.001	.001	.001	.001	.05
	2	.001	.001	.05	.001	.001	.05
	3	.001	.001	.001	.001	.001	.001
Train (TR)	2						
Loc X Race	1	.05	.05				
	2						
Loc X Type	K						
	1	All N/S. The class-size effect is found equally in all					
	2	locations--Inner City, Suburban, Urban, and Rural schools.					
	3						
Race X Type	1	.05	.05	.01			
	2						
LxRxT	1	.05	.01				
	2						
LxTRxT	2	.05	.01	.05	.05	.05	.01

NOTE: Only statistically significant (<=.05) results are shown. [a]The nonorthagonal design required tests in several orders (Finn and Bock, 1985). Results were obtained as follows: each main effect was tested eliminating both other main effects; Loc x race tested eliminating main effects and loc x type; loc x type tested eliminating main effects and loc x race; race x type tested eliminating main effects and other two-way interactions, and loc x race x type tested eliminating all else (Finn and Achilles, 1989). [b]Obtained from F-approximation from Wilks' likelihood ratio. Essentially, no statistically significant differences were obtained on the self-concept and/or motivation (SCAMIN) measures.

6. Longitudinal Achievement Results

Although each yearly analysis continued to identify the benefits of a student's being in a small class, the results for the small (about 33 percent) subsample of students in the same class size for 2 years (K-1) and 3 years (1-3) showed that the small class effect does not have a continuing cumulative effect after the large gains in K and in grade 1. The results showed that the large and statistically significant gains favoring the small classes made in the first year (i.e., K in the K-1 comparison and Grade 1 in the 1-3 comparison) were still evident in later years, but that there were no statistically significant gains in future years.

The average scores on measures of achievement used for the longitudinal analyses showed that the minority students in small classes achieved higher scores than minority students in the other class conditions, but the non-minority students continued to outperform the minority students in all class types and locations.

Combining year-by-year and longitudinal results suggests that 1) a student's achievement and development are greatly improved if the student is in a small class, 2) the small-class experience is more successful if in K or Grade 1, and 3) small-class condition gains remains in the small-class condition.

C. Summary of Non-Cognitive Results

Being in a small class did not have an impact on student self-concept and motivation as measured by the SCAMIN. Students in the inner city had somewhat higher self-concept scores than students in the other locations. Self-concept measurement of young children is difficult and results may become more stable in later years.

Students in small classes in kindergarten had significantly higher self-concept scores but not higher academic motivation scores. Classes effective in improving achievement measures are not necessarily effective in achieving positive non-cognitive results (X^2=11.71, $p<.05$, df2). There are positive ($p<.05$) relationships between each of the achievement measures and self-concept but not between achievement measures and the non-cognitive measure of achievement motivation.

The self-concept (SCAMIN) results in grade one generally were not significant based upon class size, but there was a statistically significant result based upon school location with inner-city students scoring higher than students for other locations. Essentially the pattern of results (with minor variation) found for the SCAMIN results in kindergarten and grades two and three.

Approximately 77 percent of the small-class average scores in first grade were some higher (not significantly) than the regular or regular/aide class average scores on the self-concept measures (SCAMIN). Thus, the conclusion is that self-concept was the same for students in small classes, regular with full-time teacher aide classes and in regular classes. In second grade self-concept and motivation differences as measured by SCAMIN results tended to be minimal and non-significant, but students in the inner city (primarily minority students) continued to have higher self-concept scores than did students in the other three locations.

In third grade the differences in SCAMIN results by location were considerably more marked than in K, 1 and 2 and showed that the inner-city students had significantly higher scores than did the students in classes in the other three locations. There is no significant class-size effect

for SCAMIN results; students in all three class types score about the same wherever the classes were located. By grade three, inner-city students had higher self-concepts and motivation scores as shown on the SCAMIN. The inner-city students were predominantly minority in the STAR database.

D. Summary of Achievement Results Based on Effect Sizes*

1. Students in small classes have higher performance than regular and regular/aide classes in all locations and at every grade level.

Each of the four years, small-class students in both reading and math (as well as in other SAT subtests) achieved significantly higher test scores than students in regular classes. Figure X-3 shows these differences expressed as effect sizes, for both reading and math. Small classes were constantly higher in performance.

There was a significant positive small-class effect for both reading and math at the end of kindergarten, the effect increased at Grade 1, then declined in Grades 2 and 3. Analysis of grade-to-grade gains showed that score gains in the first grade were about 15 percent larger in small classes than in regular classes, but that after the first grade, gains for both reading and math were as large, or slightly larger in regular classes as in small classes.

2. Small-class effects diminish after first grade

The small-class effect is concentrated in kindergarten and Grade 1. Thereafter the small-class effect declines slightly, but is still significant at the end of Grade 3.

This finding suggests that class size reduction should be concentrated in kindergarten and Grade 1, where effects will be greatest. This reasoning is confirmed by an analysis of the class size effect for new students who entered the project each year. The new entrants to the project allow class size effects each year to be compared with the cumulative effects for students who have been in the project from the beginning. The effect size for **new** students is about the same in reading in kindergarten and Grade 1, declines slightly in Grade 2, and is very small at Grade 3. For math, the class size effect is highest at Grade 1, not significant at Grade 2, and is fairly similar for kindergarten and Grade 3.

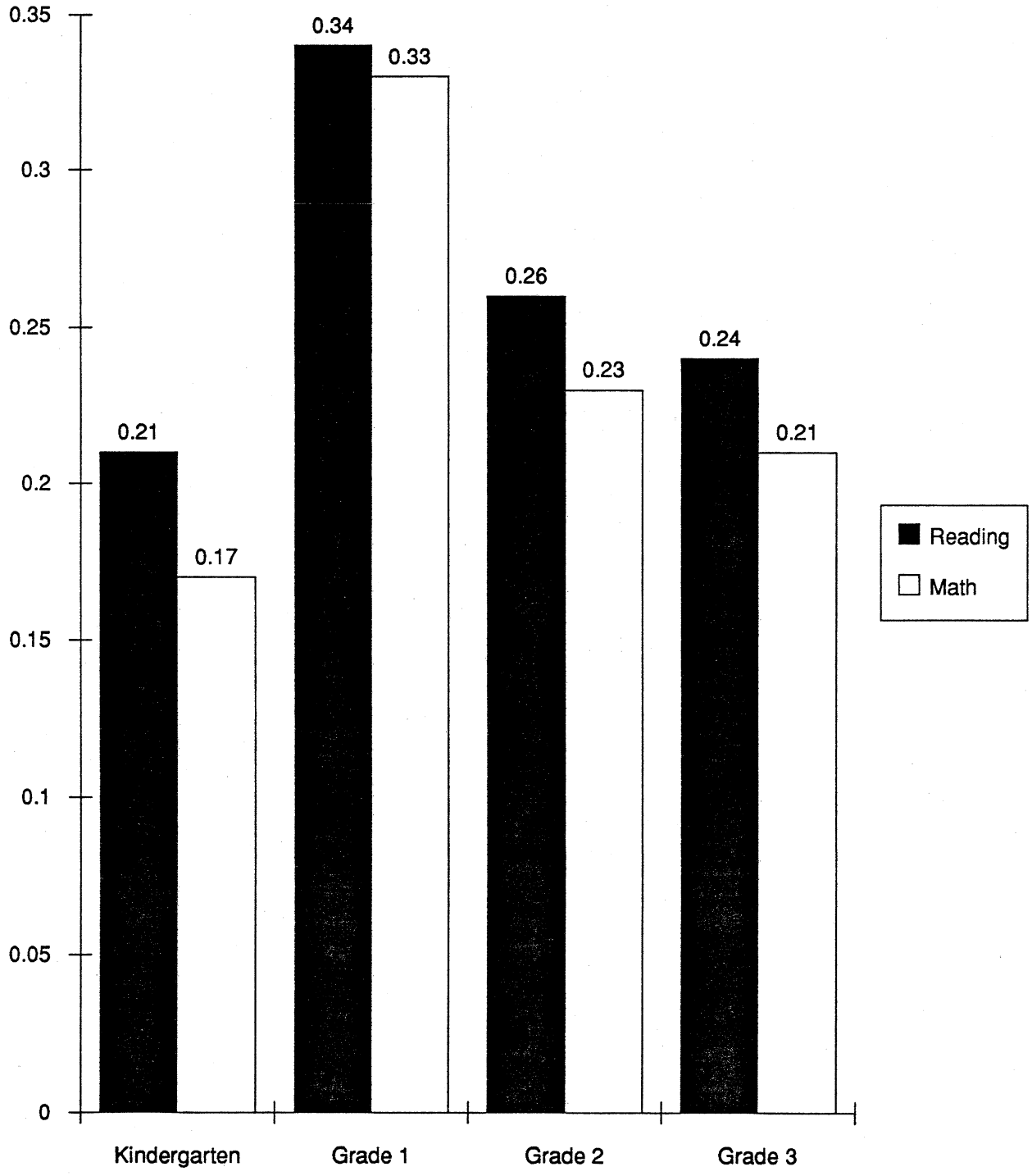
New student effect sizes also suggest that small classes should be concentrated in kindergarten and Grade 1. Effect sizes for the continuing students are always larger than the effect sizes for the new students, which is to be expected, because continuing students have had the benefit of the small class for more than one year. The effect size "advantage" of the continuing students over the new students averaged over math and reading is at approximately the same level in Grades 1, 2, and 3. This also indicates that there is no additional class size effect after Grade 1.

*Results reported here are based upon analyses conducted by Dr. John Folger, Vanderbilt University. Dr. Folger employed slightly different decision rules in selecting a sample for analysis from the STAR database. For example, as there were no differences between student performance in classes of trained and untrained teachers, Dr. Folger retained the classes of trained teachers; the primary analysis excluded them. The parallel analyses were confirmatory; they produced essentially identical results.

FIGURE X-3

Effect Sizes by Grade,

Small Classes Compared to Regular Classes, K-3



There are numerous possible explanation for larger effects in kindergarten and Grade 1, one is that it is more difficult to manage students who are not well socialized to the classroom routines. By the time children get to the second and third grades, they are better socialized, and the teacher can manage a larger group effectively. Another is that one year in a small class may serve to get a student "on track" or "up to speed" and subsequent years don't add to this benefits. This explanation would be similar to results obtained in the Reading Recovery projects. (See Figure X-4).

3. Aides were less effective than small classes in enhancing student performance at each grade level.

Classes with a full-time aide had higher achievement scores than regular classes in kindergarten through grade two but the differences were small and not statistically significant in kindergarten and second grade. In grade three the regular/aide classes' scores were slightly lower than the regular classes. In the first grade, aide classes were significantly higher than regular classes in both reading and math.

In grades one, two and three regular classes had the part-time services of Basic Skills aides; on the average they were available to each regular class about 25-33 percent of the time. The basic comparison is between a regular class with one-fourth to one-third time services of an aide, and a class with a full-time aide.

Aides performed a wide variety of clerical, custodial, and instructional tasks. The pattern of aide activities was not related to student achievement. Aides who performed mostly instructional tasks did not enhance student achievement any more than aides who did only clerical tasks. Appendix H provides an in-depth look at teacher aide activities and their effect on student achievement.

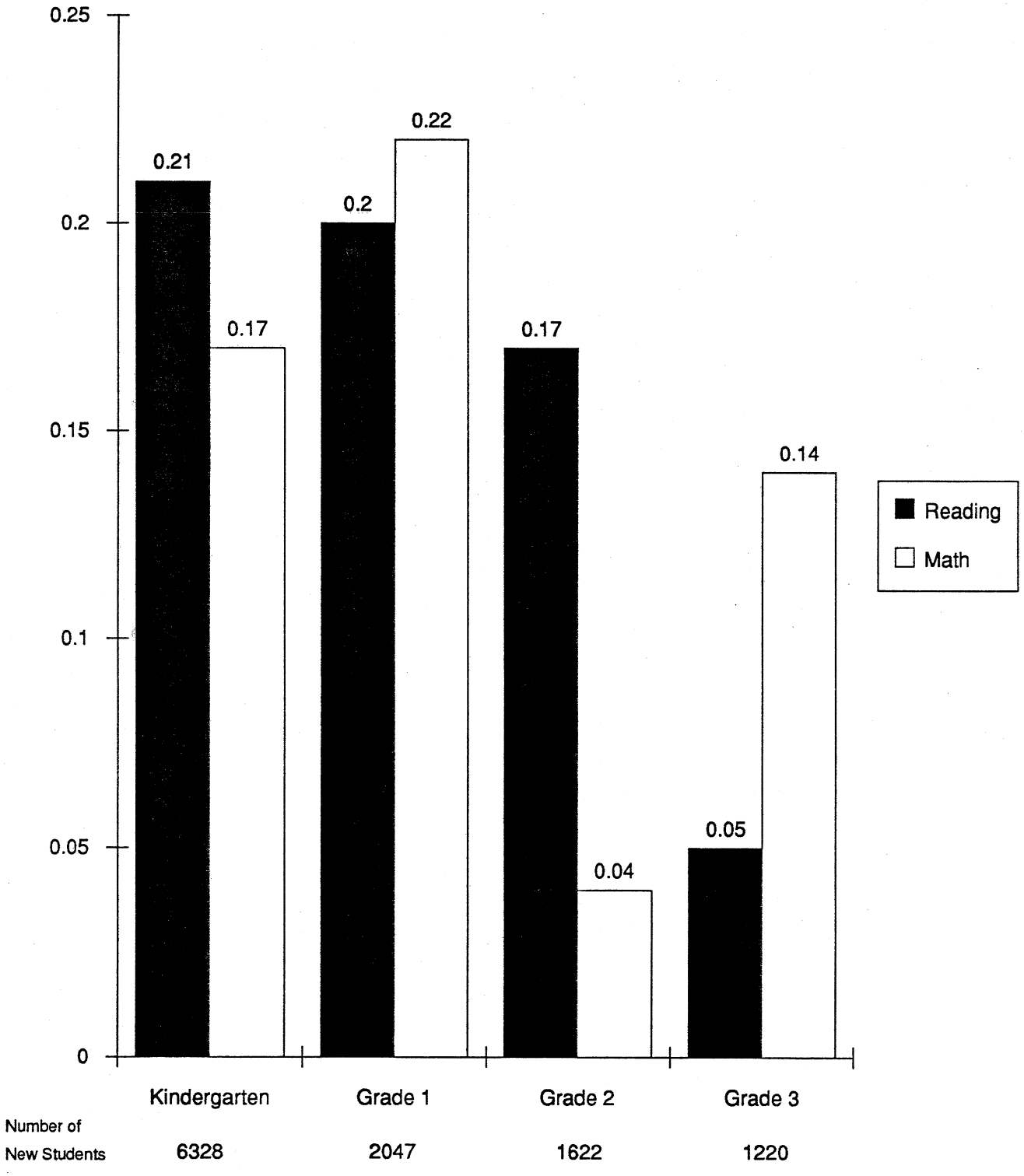
Teachers liked teacher aides. In a forced choice, about 45 percent of teachers who had an aide preferred an aide to a small class, and 55 percent favored the small class, but the bottom line is that teacher aides did not have much effect on student learning in Project STAR.

4. Math and reading effects are similar.

In a meta analysis of well controlled studies Glass (1984) estimated the **average** effect size for reading was .11, and for math it was .22 (reduction in size of 43 percent, from 35 to 20). The Project STAR effect size (averaged over four years) is .26 for reading, and .23 for math. Glass speculates that reading effects are smaller because reading instruction is done in small groups, where the overall size of the class makes less difference. Math instruction, on the other hand, is done whole group, and class size makes more of a difference. Glass's explanation did not fit Project STAR, where nearly all teachers used small groups for reading instruction but math instruction was almost all whole class. Project STAR found that class-size reduction had similar effects for all of the SAT subtests; it did not have differential effects in different subjects. Effect sizes in Project STAR were larger than those found in other well controlled studies. Slavin (1986) estimated an average effect size for smaller classes of .13, about half the Project STAR effect size. Since more positive effects of small classes have been reported for early elementary grades (Robinson, 1990), Project STAR's larger effect sizes may be because it was limited to Kindergarten through Grade 3.

FIGURE X-4

Effect Sizes for New Students Entering Project STAR Each Year for Reading and Math



5. Small classes help low socioeconomic student achievement, but they help high SES student achievement about as much.

In reading at each grade level, effect sizes for low SES students exceeded those for high SES students. At Grade 2 the difference was substantial (see Table X-2). In math, by contrast, effect sizes for high SES students exceeded those for low SES students except at Grade 2 where they were about the same.

Table X-2

Effect Sizes for Small Classes by Grade, SES, and Achievement Level Reading and Math

Test and Group	Small-Regular Effect Size			
	Kindergarten	Grade 1	Grade 2	Grade 3
Reading				
All	.21	.34	.26	.24
High SES	.19	.32	.20	.21
Low SES	.23	.35	.33	.25
Bottom quartile, previous year	---	.26	.12	.12
Math				
All	.17	.33	.23	.21
High SES	.20	.34	.21	.20
Low SES	.14	.30	.22	.18
Bottom quartile, previous year	---	.09	.25	.23

Low socioeconomic students scored lower than high SES students on the average, but there were many exceptions. To study the effect of small classes on low academic achievers, the scores of students in the bottom quartile were compared to their scores at the end of the next year to determine if a small class helped them more than a regular class.

The effect sizes for the lower quartile students were below the overall effect sizes for reading at each grade, and for math at Grade 1. At Grades 2 and 3 math effect sizes were about the same for the lower quartile and all students (see Table X-2).

These results indicate that there is no differential effect of a small class that favors low achieving or low SES students over average students or high SES students. The class size effect is "across the board" for all students.

E. Small classes reduce grade retention.

A smaller percent of students in small classes are retained each year than students in regular classes. Since grade retention has been shown by previous research (Shepard and Smith 1989, CPRE, 1990) to reduce students' chances of graduating, compared to equal ability students who are not retained, this is an advantage of small classes. Teachers were more willing to promote

marginal students in small classes. Over the four years of Project STAR, 19.8 percent of the small-class students were retained, as compared with 27.4 percent of students in regular classes. Seven and one-half percent fewer students had to repeat a grade in the small classes, this would mean about a two percent a year reduction in cost per grade. It could also save costs later because promoted students have a greater chance of completing school, and avoiding delinquency and unemployment.

F. Teacher in-service training did not improve student achievement.

One of the reasons offered in the literature for class size not making a difference is that teachers do not change the way they teach when they have a smaller class (Robinson and Wittebols, 1986). Project STAR specified that there should be training for teachers, so a subgroup of 57 teachers in thirteen randomly selected schools in Grade 2 , and another 57 teachers in the same schools in Grade 3 were given three days of in-service training before school started. The training was designed to help them to teach more effectively in whatever class type they had been randomly assigned to teach. There were not significant differences in student achievement in reading or math in either the second or third grade between classes where the teachers were trained and all the other classes where the teachers had not received special training. (See Table X-3)

TABLE X-3

Stanford Achievement Test Scaled Score Gains in Reading and Math for Students in Classes where Teachers were Trained or Not Trained in STAR Training Program

	Total Reading		Total Math	
	Trained	Not Trained	Trained	Not Trained
Grade Two	58.6	58.2	46.5	45.3
Grade Three	25.7	27.4	31.9	34.1

In exit interviews at the end of the year, about half the STAR trained second grade teachers said they had not modified their teaching as a result of the training. It is not surprising that the training program did not lead to improved student performance under these conditions. Although the statistical finding for differences in teacher behavior between class sizes and for trained and untrained teachers were not strong, many valuable findings emerged:

1. If instructional goals are to increase the development of higher-order thinking skills, creativity, and personal responsibility for learning, a reduced teacher/student ratio may be important to enable teachers to achieve these objectives effectively. Fewer rote tasks, more reading and writing in context, more problem-solving activities-- all will require more teacher/student interaction than the present curriculum. If such broad changes in learning outcomes are desired, changing class size and training teachers alone will not be enough; these changes must be coupled with a curriculum focused on these objectives.

2. Teachers with small classes must be willing to receive training and be committed to try new skills and procedures.

3. Training should include effective in-service that provides:

a. time for teachers to visit other teachers who have had success in teaching small classes and

b. training in the following skills:

(1) Ability to establish effective communication with the home.

(2) Ability to involve the family in the education of their children.

(3) Ability to make home visits that will be made during in-service time or during school time with a substitute provided.

4. This improvement effort must be encouraged and strongly reinforced by principals, local system supervisors, and state department personnel.

G. Although the reduction of class size or the presence of a full-time aide caused minimal changes in instructional practices, it did produce a more effective execution of existing practices.

Project STAR data supports the view that the fundamental organization of classroom instruction is not affected by significant reduction in class size or addition of a full-time teacher aide. However, small class and aide teachers in the year-end interviews indicated that they were able to use a wider range and amount of enrichment activities than were teachers in regular classes. This is an important possibility that could not be examined by the achievement testing, because the enrichment activities are not likely to be reflected in test data.

Based on four years of interviews, patterns emerged in kindergarten and continued through the third grade. The following advantages were apparent for instruction in small and regular/aide classes:

1. basic instruction was completed more quickly, providing more time for covering additional basic material,

2. use of supplemental text and enrichment activities,

3. more in-depth instruction regarding the basic content,

4. more frequent opportunities for children to engage in first-hand learning activities using concrete materials,

5. increased use of learning centers and

6. increased use of highly desirable primary grade practices.

Improved individualization of instruction emerged as a dominant theme in small and regular/aide class teachers' perceptions. Teachers reported: 1) increased monitoring of student behavior and learning, 2) opportunities for more immediate and more individualized reteaching or enrichment, 3) more frequent interactions with each child, 4) a better match between each child's ability and the instructional opportunities provided, 5) a more detailed knowledge of each child's needs as a learner, and 6) the necessary time to meet individual learner's needs using a variety of

instructional approaches. Significant reduction of class size or the addition of a full-time teacher aide also made positive changes in the physical, social, and emotional environments in primary grade classrooms. Classrooms were more pleasant work environments for both teachers and students. Teachers and students were under less stress, and learning occurred in a more relaxed atmosphere. Students were less likely to get lost in the crowd and were more likely to have their own unique needs met by adults who had a good understanding of them as individuals. The extent to which teachers, aides, and children were friendly, supportive, and trusting of one another was an indicator of the classroom morale and the sense of team spirit that is characteristic of effective elementary schools.

The teachers' perceptions of the value of small class size can be seen in the third grade teachers' choices of a small class, a full-time aide, or a salary increase (see Table X-4 and Table X-5).

TABLE X-4

Preferred Teaching Situation Of Small, Regular, and Regular/Full-Time Aide Teachers

	CLASS TYPE							
TEACHER PREFERENCE	SMALL		REGULAR		REGULAR/AIDE		TOTAL	
SMALL CLASS	88	(81%)	29	(71%)	46	(56%)	**163**	**(71%)**
REGULAR/AIDE CLASS	20	(19%)	12	(29%)	36	(44%)	**68**	**(29%)**
TOTAL	**108**	**(100%)**	**41**	**(100%)**	**82**	**(100%)**	**231**	**(100%)**

TABLE X-5

Teachers Preference for a Small Class or a Salary Increase

	CLASS TYPE							
TEACHER PREFERENCE	SMALL		REGULAR		REGULAR/AIDE		TOTAL	
SMALL CLASS	73	(70%)	22	(48%)	52	(63%)	**147**	**(63%)**
$2,500 SALARY INCREASE	32	(30%)	24	(52%)	31	(37%)	**87**	**(37%)**
TOTAL	**105**	**(100%)**	**46**	**(100%)**	**83**	**(100%)**	**234**	**(100%)**

H. Although reducing class size is more expensive than adding a full-time teacher aide, it is more cost effective.

The cost of reducing class size by one third is primarily the additional salary cost of adding teachers, and the capital costs for new classrooms that must be added. Reducing class size from 23:1 to 16:1 statewide in K-3 would require about 175-180 million dollars in additional operating expenses. If we assume that 20% of these classes are available in schools now, the additional capital costs would be 21-25 million each year amortized over 30 years for a total annual cost of 196-205 million. The need for additional classrooms could be eliminated by the implementation of year round schools. Reducing class size just in K and 1 would cost a little less than half the total (kindergarten is about 10% smaller than Grade 1) or about a 100 million dollars. It would add about 30-32 percent to the current cost per student. Adding a full-time aide in Grades K-3 would add about 75 million dollars, if the aide were only added in Grade 1 where the only aide effect was found, the cost would be about 19-20 million dollars.

If a reduction in class size is to be done in phases the program should begin in grade one with classes of 1 to 15 because that is where the greatest small-class effect was found and where the cost effectiveness would be greater. Small classes will have the greatest cost effectiveness when teachers use those teaching practices best suited for small classes. A small class provides an opportunity to do things better and differently and break out of the "more of the same" mindset. Teachers can use new teaching strategies. Home visits and increased involvement of adults or parents in the education of their children, team learning strategies, individual programming (and remediation) for each student, improved screening for physical and learning disabilities are all possible with small (1:15) classes. Small classes may be seen as a minimum foundation program which will allow variations or additions previously desired but untried due to excessive "case loads" for classroom teachers. These types of changes may require extensive training and practice before substantial benefits are achieved. The Star training program pointed out the need for more in-service with a new approach.

I. Estimates of the Magnitudes of the Differences (Grades K,I,2,3)

One important question in this study was "How large are any small class and regular with teacher-aide class advantages?" The magnitude of difference begins to get at the policy questions upon which this study was founded and to explore the educational significance of the statistically significant results obtained.

The "small-class" advantage is evident; it increases in K and 1 and decreases thereafter. Gains realized in K and Grade 1 remain evident, but decreased in grades 2 and 3. The teacher-aide advantage, like the small-class advantage, is most pronounced in grade 1 and it declined thereafter. There is no important teacher-aide advantage in K.

There is a consistent and fairly large scaled score difference favoring the small class over the regular class at each grade (approximately 10-12 in Total reading and 8-11 in math). This difference is also reflected in the higher percent of BSF criterion-referenced test items answered correctly by students in the small-class condition. These results are summarized in Tables X-6 and X-7 for the differences in performance of white and minority and all students in small and regular classes for the SAT Total Reading and Total Math (K-3) and the percent passing difference on the BSF (1-3; no K test). The SAT differences are effect sizes; the BSF are percents.

Table X-6

Summary of Estimates of Small Class Effect Sizes on Total Reading and Total Math, Grades K-3 Project STAR, 1985-1989.

	Group	Kindergarten	Grade 1	Grade 2	Grade 3
Total Reading	White	.18	.25	.19	.17
	Minority	.25	.52	.42	.32
	ALL	.21	.34	.26	.24
Total Mathematics	White	.20	.25	.19	.17
	Minority	.09	.38	.27	.22
	ALL	.15	.33	.23	.21

TABLE X-7

Differences in Average Percent Passing BSF Test of Reading and Math Between Small Classes and Other STAR Classes, Grades 1, 2, and 3

	Group	Grade 1	Grade 2	Grade 3
BSF - Reading	White	4.8%	1.6%	4.0%
	Minority	17.3%	12.7%	9.3%
	ALL	9.6%	6.9%	7.2%
BSF - Mathematics	White	3.1%	1.2%	4.4%
	Minority	7.0%	9.9%	8.3%
	ALL	5.9%	4.7%	6.7%

J. Conclusions

The design and magnitude of Tennessee's randomized class size experiment (STAR) allow researchers to make, with high levels of confidence, statements about class-size effects. Here are some examples from prior reports. "This research leaves no doubt that small classes have an advantage over larger classes in reading and mathematics in the early primary grades" (Finn and Achilles, 1989:21). "This experiment yields an unambiguous answer to the question of the existence of a class-size effect, as well as estimates of the magnitudes of the effect for early primary grades" (p.22). "These data confirm that a small-class effect, while not immense, is found in two basic subject areas, at four grade levels, and in all four school settings...Few, if any, other classroom-level interventions have been identified that have a consistent impact of this sort" (Finn, et al., 1989: 15-16).