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ABSTRACT

In 1986, the Tennessee legislature authorized the Student/Teacher Achievement Ratio (STAR) project. At the end of the school year, interviews were held with teachers from kindergarten through third-grade levels on their perceptions of teaching either in a small class, in a regular class with a full-time aide, or in a regular class. The following categories of teacher perceptions were identified: (1) grouping of pupils' (2) physical and social climate, (3) learning centers and activities, (4) classroom management, (5) pupil evaluation, (6) teacher morale, (7) pupil achievement, (8) instructional practices, (9) teacher planning, and (10) teacher/student relationship. Time was a dominant theme observed throughout small class and regular/aide class teacher interview responses. The amount and pace of academic content covered was the most pervasive time related difference noted by all of the small class teachers. Increased opportunities for more individualized instruction emerged as a second dominant theme when small and regular/aide class teachers talked about differences between teaching in a small or a regular size class. A discussion is presented on findings in each of the identified categories of teacher perceptions. (JD)

What Are Teachers' Perceptions of Teaching in Different Classroom Contexts?

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It is becoming increasingly clear that significant reduction of class size (13-17 pupils) in kindergarten through third grade classrooms does result in increased pupil achievement as measured by standardized reading and math achievement tests (Achilles, Bain, Folger, Johnston, & Lintz, 1987, 1988; Finn, Achilles, Bain, Folger, Johnston, Lintz, , & Word, 1989; Word, Bain, Folger, Johnston, & Lintz, 1989). Exactly how teaching and learning changes in K-3 classrooms with fewer pupils is less clear. Relatively little is known about how overall classroom life for teachers and children in small size classes differs from that in regular size classes of about 25 pupils.

The contemporary policy debate about optimal class size often neglects consideration of how classroom life changes when class size is reduced or when teacher/pupil ratio is reduced by use of full time teacher aides. Reviewing 22 studies of class size and teaching practices, Robinson and Wittebols (1986) conclude that smaller classes tend to promote the use of more desirable teacher practices; noting correctly however, that smaller classes do not guarantee that teachers will take advantage of having fewer pupils and modify their teaching practices. Teachers in small size classes were found to use more desirable classroom practices such as more attention to individual children, and more individualization of instruction.

In a review of nine studies using direct classroom observations to measure teaching practices in larger and smaller classes, Robinson and Wittebols (1986) report that six studies found no significant difference in teaching practices; and

that three studies found teachers in smaller classes using more desirable practices. Cahen, Filby, McCutcheon, and Kyle (1983), in a qualitative study of changes in instructional processes in teacher and student behavior in small classes also observed positive changes in teaching practices. Johnston and Davis (1989) analyzed interviews with teachers who had taught in small size classes and reported positive changes in several dimensions of quality of life for teachers and children in small classes. Johnston's (1990) analysis of a large number of teacher interviews found that K-3 small class size teachers reported engaging in teaching practices that were more developmentally appropriate and congruent with knowledge of child development.

Overview of Project STAR

The Tennessee Legislature authorized a statewide 12 million dollar, four year, longitudinal demonstration policy study to consider the effects of class size on pupils in primary (K-3) grades. The Student/Teacher Achievement Ratio project (Project STAR) began in August, 1985 with representatives from Memphis State University, Tennessee State University, University of Tennessee-Knoxville, Vanderbilt University, the State Department of Education, the State Board of Education and the State Superintendent's Association working in a consortium to design, conduct, and monitor the project. The results reported in this paper represent only a small portion of this larger study (Achilles et al., 1987, 1988; Word et al., 1989).

Project STAR's enabling legislation mandated that participating schools should represent Tennessee's population of inner-city, urban, suburban, and rural schools; and should also be drawn from all three geopolitical divisions of the state. There were 79 schools in 42 school systems that participated in the study. Consideration of the comparisons required by the legislation, as well as other variables, led to development of a within school design. Project staff

randomly assigned teachers to each of three class types: small classes (*S*, 13-15 pupils), regular classes (*R*, 22-25 pupils), and regular classes with full time teacher aides (*RA*, 22-25 pupils). The over 7,000 pupils involved in Project STAR were also randomly assigned to each of the three class types by project staff. In general, pupil outcome data were collected regarding academic achievement, academic self-concept and motivation, attendance, and promotion/retention and special education referral status. Age, race, sex, and SES data were also gathered on each pupil. Information was collected regarding parent-teacher interaction, classroom grouping practices, and use of time, and teachers perceived problems. Exit interviews were conducted with teachers at the close of each school year.

Teacher Exit Interview Data Source and Procedures

The annual Teacher Exit Interview protocols were the primary data source for this present paper. Interviews were conducted by representatives of the university consortium in May 1986, 1987, 1988, and 1989 with 128 *S* kindergarten teachers, 126 *S* first grade teachers, 86 *S* second grade teachers, 88 *S* third grade teachers; 101 *R* kindergarten teachers, 113 *R* first grade teachers, 54 *R* second grade teachers, 55 *R* third grade teachers; 99 *RA* kindergarten teachers, 107 *RA* first grade teachers, 71 *RA* second grade teachers, and 70 *RA* third grade teachers. In sum, over a four year period 1,003 kindergarten, first, second, and third grade teachers participated in related structured, year-end interviews.

Kindergarten teacher interviews. The primary question explored in depth with each Project STAR kindergarten teacher was: If your experience was different this year than last year, then how was it different? A three stage iterative analysis was performed on the first year (kindergarten) data. In the first stage the protocols were examined to identify and define common themes. In the second stage protocols were categorized along the dimensions of those themes. In the third stage a random set of responses, which had been set aside at the outset of the

analysis, was used to check the reliability of the theme categories and the coding process. Examination of the 328 kindergarten teacher interviews revealed 17 distinct categories. Three categories addressed project procedures and pupil characteristics and are not addressed in the present analysis. Fourteen categories were identified to address teachers' perceptions of teaching either in a small class, a regular class with no aide, or in a regular class with a full-time aide. Each category is described below.

Grouping of pupils - Describes classroom grouping practices and groups. Refers to number of groups, purpose of groups, forming groups, determining group membership, flexibility of group membership over time, use of aides related to groups.

Physical environment - Describes features of the classroom physical environment. Refers to amount and use of classroom space, furniture arrangement, heat, light, noise level, and traffic patterns.

Learning centers - Refers to the presence of, setting up, provisioning, managing, using, perceived effects of, and quality of learning centers in the classroom. Includes references to use of aides related to learning centers.

Social climate - Refers to social interactions among children and between teacher and child. Includes references to cooperation between children, and teacher knowledge of individual children's strengths and weaknesses, both personal and academic.

Enrichment Activities - Refers to those experiences and people that provide pupil learning opportunities other than the usual classroom instructional activities; examples include: cooking activities, special art, music or drama, field trips, and invited guests in the classroom. Includes references to planning and carrying out enrichment activities and the use of the aide with enrichment activities.

Classroom management - Refers to pupil problem behavior, and includes statements indicating the frequency of problem behavior, the bothersomeness of such behavior, and techniques to prevent and deal with problem behavior.

Monitoring and evaluating pupil progress - Refers to monitoring pupil progress, appraising pupil progress, and giving pupils feedback about their progress.

Morale and attitude toward work as a teacher - Refers to having a positive outlook, being or not being tired, level of frustration and stress, degree of satisfaction, physical health and well-being, and mental health and well-being.

Amount or rate of pupil progress - Refers to amount of material covered, and how quickly pupils grasped the material. Includes references to the aide relative to amount or rate of material covered.

Parent-teacher relationships - Refers to how parents are used, problems with using parents in the class, parent-teacher communication, and home-environmental factors.

Teacher Aides - Includes responses about having or not having an aide, quality of the aide, use of aide or aide duties, and aide characteristics.

Instruction - Includes references to instructional time, purposes, curriculum, instructional goals, teaching methods and techniques, and degree of structure.

Teacher planning and preparation - Refers to planning class activities, preparation of teaching materials or the instructional environment. Includes references to paperwork, copying, duplicating, stapling, record keeping, collecting money, etc.

Individual attention to pupils - Refers to one-on-one attention or instruction to children. Includes references to reteaching and reinforcement of content as well as pupil counseling.

<u>First through third grade teacher interviews.</u> The second year (first grade) interview schedule included the fourteen themes identified from the

kindergarten interviews. All first grade teachers were also asked to identify any additional differences not covered in the 14 areas; however, no further differences emerged.

The third year (second grade) interview schedule was developed from significant themes which emerged from the previous two years, and from variables identified from research literature on instruction. The 1988 second grade Teacher Exit Interviews asked teachers to describe differences, if any, that they perceived regarding the following dimensions: (a) amount of content covered, (b) amount of instructional time on task, (c) monitoring children's work, (d) ability to match level of instruction to the ability of individual pupils, (e) pacing of instruction, (f) degree of active pupil-teacher academic interaction, (g) individual attention to children, (h) classroom social climate, (i) demands on available teacher time, and (j) use of full time teacher aide. These ten dimensions emerged from 1986 exit interviews with teachers (Achilles et al., 1987), 1987 exit interviews with Project STAR first grade teachers (Johnston, 1988), and instruction research literature. The fourth year (third grade) interview schedule contained all unique dimensions identified and employed in the earlier kindergarten through second grade interview schedules.

A Summary of Project STAR K-3 Teacher Exit Interviews

Project STAR kindergarten through third grade teachers assigned to small size classes, regular size classes, and regular size classes with a full time aide were interviewed at the end of each school year from 1986 through 1989. The broad purpose of these exit interviews was to identify and describe those aspects of classroom teaching that teachers experienced differently in comparison to the previous year's experience in a regular size class. The results of these interviews

provide insights regarding why small size classes and regular/aide classes out performed reguiar size classes on norm and criterion referenced, standardized measures of reading and math achievement.

Teachers' perceptions of how their experiences differed between teaching in a small size class (1:13-17) or a regular size class with a full time aide (2:23-27), and teaching in a regular size class (1:23-27) were consistent from grade level to grade level. With very few exceptions, the differences reported by K-3 small class and regular/aide class teachers were essentially similar. Interview responses from these two groups differed only in their explanations of the reasons for the differences they described. Small class teachers explained how their teaching had differed in relation to having only 13-17 children, whereas regular/aide class teachers explained how having a full time teacher's aide accounted for the differences they experienced.

An Overview of Regular Size Class Teacher Perceptions

Regular size class Project STAR teachers were interviewed each year along with small class and regular/aide class Project STAR teachers. The purpose of the kindergarten through third grade regular class teacher interviews was to monitor the effect of participation in Project STAR on the normal course of schooling in each project school and grade level. Most K-3 regular class teachers reported that there had been no difference between their teaching experience during the project year and the previous year of teaching. The differences that were described by the K-3 regular class teachers focused primarily on differences in their work setting and requirements that resulted from their school system's participation in Project STAR.

Random assignment of both children and teachers to small, regular, and regular/aide classes was a strong feature of the Project STAR research design. However, for many schools this design feature mandated changes traditional

patterns and practices of grouping children in classes within a grade level. The result of randomly assigning children to classes meant that many kindergarten through third grade teachers who had been accustomed to teaching homogeneous ability grouped classes were now faced with teaching classes that were a heterogeneous mix of low, average, and high ability pupils. This meant that some teachers, who for years had been teaching classes composed only of high achieving children, now had to change their teaching practices to accommodate classes containing middle and low achieving children as well. In some instances, Project STAR's random assignment procedures also caused these teachers, for the first time, to teach classes which contained low achieving Chapter I pupils. Also, for some regular class teachers, their school's participation in Project STAR meant slightly smaller classes than the 25-27 children they normally would have had.

An Overview of Small and Regular/aide Class Teacher Perceptions

Small class and regular/aide class kindergarten, first, second, and third grade teacher exit interviews (1986-89) provide useful insights into two related and fundamental aspects of life in primary grades: the process of instruction, and the classroom learning environment. When small and regular/aide class teachers were asked how their experience teaching a small or a regular/aide class was different from their experience teaching a regular size class, they talked about instructional time in relation to rate of pupil progress, instructional pacing, instructional time on task, and demands on the teacher's available time. They talked about instructional processes and strategies in relation to planning, grouping, monitoring pupil work, individualizing instruction, and using learning centers and enrichment activities.

Small and regular/aide class teachers also described fundamental differences between the overall classroom work environment in small and regular/aide versus regular size classes. They spoke about the classroom's physical environment, interpersonal relations within the class, parent relations, classroom management, and their own morale as teachers.

Instruction in Small and Regular/Aide Classes

K-3 Small and regular/aide class teachers described two salient differences between their experience of instructing children in small or regular/aide classes, and their experience teaching in regular size classes: availability and use of time, and opportunity to individualize instruction.

Time and Instruction

Time was a dominant theme observed throughout small class and regular/aide class teacher interview responses. The amount and pace of academic content covered was the most pervasive time difference noted by kindergarten through third grade teachers. Most small and regular/aide class teachers reported covering required content faster and covering more content than they had been able to with a regular size class. Teachers reported, for example, covering more required objectives, or completing all grade level reading and math texts. Many teachers explained how they had gone into more depth than ever before. Teachers reported learning that their daily schedule could be more relaxed, and that they would still complete necessary work. This meant, for example, that there were more opportunities to pause and look things up in the dictionary or encyclopedia. They could spend more time discussing a topic, and that more children would have an opportunity to participate.

Variety and appropriateness of learning opportunities. Small and regular/aide class teachers discovered early in the school year that necessary basic instruction required less time, making more time available for other uses. Some

teachers used this time as an opportunity to provide a greater variety of learning opportunities for their pupils. For example, teachers described using more manipulative materials and first hand learning activities including learning centers, math/science and health experiments, and social studies projects. Teachers also frequently cited making increased use of enrichment activities such as creative writing, music, art, drama, newspapers in the classroom, and supplemental activities included in adopted reading and language arts texts. Still others used the new available time to cover the required basic material in more depth. These teachers reported, for example, engaging in more frequent and more lengthy discussions with children, spending the time necessary to insure that each child understood the material, more opportunities for children to work at the board, and increased use of reference materials when appropriate.

Regular/aide class teachers explained that the aide was available to spend the time necessary to help provision, monitor, supervise, and clean up projects, hands on activities, and learning centers. Small class teachers related how having fewer children meant that implementing such projects was more manageable, that increased space available for these activities allowed more movement and pupil interaction, and that monitoring and supervision of these learning activities was easier. Both small and regular/aide class teachers felt that having either fewer children or a full time aide made it easier and less risky to provide a wider range of developmentally appropriate learning opportunities for primary grade children.

Individualized instruction. Small and regular/aide class teachers also related the increased amount and rate of content covered to their increased ability to individualize instruction. Because they were not as hurried, because they knew that with a small class or with a full time teacher's aide they could complete the required objectives within the time allowed, pupil papers were more often checked on the spot, and then immediate feedback and reteaching was provided

by the teacher or the aide. They reported spending more instructional time with each child than they had in a regular size class. Teachers reported longer periods of more individualized instruction than they had been able to provide when they taught in a regular size class.

Teachers reported that with fewer children or with a full time aide instruction took less time because pupils were more on task and could get quick help when needed. Teachers attributed this difference to increased ability to monitor pupil behavior and academic progress. They described how management and supervision was easier with fewer children or with a full time aide. They reported that potential off-task behavior could be observed and then nipped in the bud. Teachers reported having a better sense of what was going on in the classroom, of what children were or were not doing. In addition, teachers reported that fewer pupils or an aide meant that during a given instructional period they were more able to provide immediate help, check papers, and reteach if necessary. Teachers reported that when they observed children having problems learning new content, they, or the aide, were more able to provide on the spot individual or ad hoc small group reteaching. Regular/aide class teachers, in particular, felt they were able to deliver unhurried assistance if a child needed it, since the aide was available to monitor and supervise the rest of the class. Small class teachers also noted that they could make more efficient use of available time because they had more specific knowledge about each child's level and instructional needs.

Individualizing Instruction

Increased opportunities for more individualized instruction emerged as a second dominant theme when small and regular/aide class teachers talked about differences between teaching in a small size or regular/aide class, and teaching in

a regular size class. These differences became apparent as teachers described instructional processes and strategies in relation to planning, grouping, monitoring pupil work, and using learning centers and enrichment activities.

Planning and grouping for instruction. Most small and regular/aide class teachers reported no difference between planning for a small or regular/aide class compared to a regular size class, though a few reported spending less time in planning. Several small class teachers reported spending more time planning because the class was constantly progressing and needed fresh chalienges. Similarly, several regular/aide class teachers reported spending more time planning the aide's work, in addition to their own. Most small class teachers reported using fewer reading groups, and indicated this produced time available for other activities. Small class and regular/aide class teachers also reported that more often than in the past they formed impromptu or specialized groups to better meet more learning levels.

Regular/aide class teachers generally reported that working with groups was easier than when they had no aide assistance. The aide allowed more time for teaching and a greater degree of instructional individualization. Teachers described using the aides to work with individuals and small groups of children who were having difficulty mastering the objectives. Teachers noted that the aide's assistance with clerical and administrative tasks allowed them more time to work with groups. The aides also allowed teachers longer and more uninterrupted periods of small group instruction by monitoring the rest of the class while the teacher worked with the group.

Monitoring and evaluating pupil learning. Most small and regular/aide class teachers reported that monitoring and evaluating pupil progress was easier, required less time, was more efficient, and resulted in greater individual attention than was their experience teaching in a regular size class. The most common explanation offered was that because there were fewer children or a full

time aide, papers could be checked on the spot and then each child could be given immediate feedback. Difficult content could be retaught to individuals or small ad hoc groups as needed. Similarly, with fewer children or an aide in the classroom teachers were able to monitor more closely children's work during the act of instruction, so that monitoring and reteaching were simultaneous. Several small class teachers indicated that they used fewer written tests because they were not necessary since they had more detailed knowledge of each child's progress based on daily work and individual interactions with each pupil.

In most cases small and regular/aide class teachers connected the faster, more frequent, and more individualized feedback to increased opportunities for immediate reteaching. These teachers also related improved monitoring to better ability to match instruction to the needs of above and below average pupils in the class Second and third grade teachers in particular noted that children who were having problems were more likely to ask questions and request help than in a regular size class. Many teachers also explained that the improved monitoring was also connected to greater opportunities for individualized enrichment activities for children.

A concern expressed by a few small class teachers was that increased monitoring was necessary because small class pupils had come to depend on quick help or feedback from the teacher. One teacher explained that "kids have come to expect more monitoring," and another noted that "children almost demanded more immediate feedback." Another teacher who observed that the children had grown accustomed to the increased attention from and interaction with her, also pointed out that in exchange her children were more willing to ask questions, and more willing to say that they did not understand.

While most regular/aide class teachers reported that they had a better sense of individual pupil progress, a few regular/aide teachers expressed a contrasting

concern. Some teachers noted that because the aide was checking most of the papers, the teacher was not as aware of what immediate reteaching was needed by each child.

Matching instructional and pupil ability levels. In general, small and regular/aide class teachers indicated that it was much easier to match the level of their instruction to the level of the pupil's ability than it had been when they taught in a regular size class. Their explanations for why this was easier related to having more detailed and accessible knowledge of pupil ability levels, and to having the time to provide immediate, individual attention to pupils.

Some second and third grade small class teachers reported that their classes were more homogeneous than any class in the past, so matching the level of instruction was not difficult. Small class teachers reported that in particular it was easier to individualize instruction for pupils having learning problems than it was in a regular size class. Having the time available for immediate monitoring and reteaching was described as critical in this regard. Recall that some teachers perceived pupils in small class to be more willing to seek the teacher's help. Others have observed that in contrast to children in regular size classes, children in small classes acted to adjust the match between the level of instruction and their own ability level by demanding help if they were having trouble.

Regular/aide class teachers described an improved match as a result of the aide working one-to-one with children who were having difficulty learning. They described how the aide contributed to an improved instructional match through increased use of learning centers and enrichment activities. Regular/aide class teachers described how the aide was used as a roving tutor to answer children's questions who were engaged in assigned seatwork while the teacher was leading small reading groups. They described how the presence of the aide to supervise and monitor the class allowed the teacher to work one-on-one

or in small ad hoc groups with children who were experiencing difficulties. Finally, regular/aide class teachers described how the presence of the aide provided more detailed knowledge of each child's ability level, thus allowing a more precise match of assignments and ability.

Teacher-pupil academic interaction. Most small and regular/aide class teachers responded that they had experienced significant differences in the degree of active pupil-teacher academic interaction when compared to their experience teaching in a regular size class Generally small class teachers described that class discussions were more frequent than in a regular size class and that all children in the class tended to be involved in these discussions. Teachers reported that they employed more higher level thinking activities, and that children had more opportunities to participate. Teachers were better able to insure that all children got a turn, that no one was left out.

Second grade and particularly third grade small class teachers observed that the children appeared to be less inhibited, less afraid of being wrong and that they volunteered to answer questions more often. One teacher observed, "They feel safe with their ideas and they're not going to be put down." Teachers described children in small classes as more curious, enthusiastic, and eager to participate than were children in their regular size classes. Several teachers noted this was particularly the case in their low achieving reading group.

Some regular/aide class teachers related that having two adults in the classroom meant that children could receive twice as much interaction as before. Others described how the presence of the aide resulted in more personal attention to individual children, and improved knowledge of children as individuals. Some regular/aide class teachers explained that the instructional time spent with children was more concentrated because having the aide in the classroom meant that behavior was better and therefore the teacher could devote undivided attention to those children she was teaching.

Learning centers and enrichment activities. Small and regular/aide class teachers reported providing children with learning opportunities beyond traditional whole group and seatwork instructional patterns more often than they had been able to provide when teaching a regular size class. In particular, small and regular/aide class teachers described using more learning centers and implementing activities such as cooking, special art, music, drama, field trips, science and math experiments and demonstrations, social studies projects, creative writing, and parent or volunteer speakers from the community. Teachers reported that because more time was available, they made more use of such enrichment activities than they had when teaching a regular size class. Teachers also reported making more use of supplemental instructional materials and enrichment activities provided in the adopted reading and math textbooks. Teachers appeared to be more willing to implement complex or messy activities in small size or regular/aide classes because more classroom space was available, and because they, or they and the aide, could adequately monitor and supervise the activity.

Small and regular/aide class teachers also reported having time to make more use of learning centers than they could in a regular size class. Small class teachers noted that with fewer children each child got to go to centers more often and stay for longer periods of time. They observed that the quality of time children spent in centers was better than before, children were not as rushed, there was more available space, and there were fewer children to share limited materials. These conditions contributed to less friction, and fewer discipline problems during center work. Moreover, small and regular/aide class teachers reported improved ability to monitor and supervise children working in centers.

The Learning Environment in Small and Regular/Aide Classes

Teachers experienced fundamental differences in the physical, social, and emotional classroom work environment in small size or regular/aide classes, as compared to their experience in regular size classes. They told interviewers about the classroom's physical environment, interpersonal relations among teacher and pupils, parent relations, classroom management, and their own morale as teachers. Differences in availability and use of time during the school day, and opportunity to know and respond to children on a more individualized basis characterized small and regular/aide class teacher perceptions of their classroom environment.

Interpersonal relations. Small and regular/aide class teachers indicated that they had better knowledge of children as individuals, their families and their home background; that their relations with children were improved; and that children's relations with each other were more positive than they had experienced in a regular size class. Kindergarten through third grade teachers reported that more time was now available to *listen* to children, to get to know their personal lives and concerns. Conversely, teachers also perceived that children knew more about the teacher as an individual with a history, interests, and a life outside of school. Teachers reported feeling more like a part of the class. Small class teachers noted that children were more willing to approach the teacher, that they more frequently initiated conversation with teachers about personal matters.

Differences in relations among children were consistently noted by kindergarten through third grade small class teachers. Small classes were frequently described as like a family. For the most part children in small classes were described as unusually cooperative, supportive, tolerant, and caring. Teachers noted that children stood up for each other, and that children were more willing to take risks in class. Children encouraged classmates to try, to risk,

and would not accept less than a good effort from their peers. Small class teachers described their group as more cohesive, and noted that there was less bickering in contrast to their experience teaching in regular size classes. Small class children were described as more relaxed, as more willing to openly express thoughts and feelings.

An unavoidable feature of Project STAR's within school research design meant that children attending small schools serving stable school populations spent four years in a small class with essentially the same fifteen or so classmates. It could be argued that the closeness among children resulted from being together in the same small group for four years. However, kindergarten teachers made the same observations about relations among children, and to the same degree as did their first, second, and third grade counterparts. Some second and third grade teachers reported that when the small class membership had remained essentially intact for three or four years, children often did not get along well, and were not receptive to new classmates entering the group. This finding appears to be an artifact of the research design, and was not reported in instances where small group membership varied from year to year.

Kindergarten through third grade regular/aide class teachers were overwhelming in their response that there had been more individual attention to pupils as compared to their experience teaching in a regular size class without aide assistance. Teachers reported that children received more emotional and social attention from the teacher and the aide. The pace of the classroom was more relaxed and teachers commented that they were more relaxed and more open to non-academic interactions with children. Teachers did not feel as rushed because the aide was there to handle matters if necessary. Many teachers explained that with two adults in the classroom it was possible for someone to be available to listen to children when they needed to ask an academic question or when they needed to talk about a personal matter.

Classroom Physical Environment. Small class teachers identified increased classroom space, use of classroom space, and lower noise levels when describing the differences between teaching in a small size and in a regular size class. Teachers referred general to "more space" reporting that they kept the same room arrangement but simply spread out more; some citing increased space between children's desks, others noting broader pathways for movement within the room. Teachers reported allowing children more freedom to move about the room than they had in a regular size class.

When small class teachers spoke in detail about how they utilized the increased space resulting from fewer children in the room, they more frequently reported providing more activity/interest/learning centers, as well as increased space for children to work on the floor for art projects, games, reading, and for increased opportunities for children to work in partners and small groups for independent, cooperative learning. Small class teachers variously described lower noise levels in the classroom, higher levels of productive noise, and their own increased tolerance for noise and movement. It appears that the increased classroom space resulting from smaller class size led to greater flexibility in classroom arrangement, increased numbers of learning and enrichment activities, and in more opportunities to make use of these activities.

Regular/aide class teachers reported that the aide helped to better manage available classroom space by monitoring and directing the traffic flow while the teacher was engaged in instruction. Several teachers noted that the noise level was lower because the aide helped keep things quiet, particularly when the teacher was engaged in instruction. In contrast, some teachers noted that having two adults working in the classroom at the same time resulted in higher noise levels. Some perceived this to be a distraction, others did not mind since it was productive noise.

Managing the behavioral environment. Both small and regular/aide class teachers reported striking differences in their experiences of managing classroom rules, procedures, and pupil behavior in contrast to their experience teaching in regular size classes. The overwhelming comment was that classroom management was easier and that there were fewer behavior problems than in a regular size class. The primary explanation offered by small class teachers for this difference was that with fewer children to monitor it was easier to be aware of potential problems before they became problems. With fewer children teachers reported they could respond faster, and that their response was more considered and individualized. Teachers felt more proactive and less reactive. Regular/aide class teachers attributed differences in classroom management to having a full time aide who could provide more attention to children while the teacher was engaged in instruction. Teachers felt that increased attention from two adults reduced the likelihood that children would try to misbehave. Further, teachers reported that having the aide present in the classroom meant that problems could be dealt with immediately rather than having to wait for a break in class instruction.

Quality of teacher work life. Small and regular/aide class teachers reported differences in their morale and work attitudes when teaching in small and regular/aide classes in contrast to their experience in regular size classes. Teachers reported that they felt more relaxed, less pressured, and more satisfied at the end of the day. Time appeared to be an important factor in these teachers perceptions of their work life. They felt more less pressured because they knew they would be able to get the required basic instruction completed. They felt more satisfied because they were able to interact more frequently with each child on both a personal and academic level. They felt satisfied because they did not have to be as controlling, and because they had the time to more be flexible in meeting individual pupil needs using more developmentally appropriate approaches.

Their satisfaction extended to their home life, with many K-3 small and regular/aide class teachers reported that they did not take as much work home as they had when teaching a regular size class. In sum, small and regular/aide class teachers felt like the were able to accomplish more using more desirable methods, than they could when teaching in a regular size class.

Conclusions From Project STAR Teacher Interviews

Based on four years of interviews with kindergarten through third grade Project STAR small and regular/aide class teachers, the following differences are apparent between instruction in small and regular/aide classes, and instruction in regular size classes. Basic instruction is completed more quickly providing more available time. Small and regular/aide class teachers used this newly available time for covering additional basic material, use of supplemental text and enrichment activities, more indepth instruction regarding the basic content, more frequent opportunities for children to engage in first hand learning activities using concrete materials, and increased use of learning centers. These patterns emerged in kindergarten and continued through the third grade.

Improved ability to individualize instruction also emerged as a dominant theme in small and regular/aide class teachers perceptions of differences between instruction in small and regular/aide classes and regular size classes. Again citing extra available time as the crucial factor, small and regular/aide class teachers reported increased monitoring of pupil behavior and learning, opportunities for more immediate and more individualized reteaching or enrichment, more frequent interactions with each child, and a better match between each child's ability and the instructional opportunities provided. Small and regular/aide class teachers perceived that they had a more detailed and accessible knowledge of each child's needs as a learner, moreover, they felt like they had more time available to meet individual learner's needs using a variety of instructional approaches.

Small class size or the presence of a full time teachers aide fostered the increased use of learning approaches generally considered by educators to be highly desirable, developmentally appropriate primary grade practices.

Significant reduction of class size, or the addition of a full time teacher's aide also makes positive changes in the physical, social, and emotional environments in primary grade classrooms. Classrooms are more humane and pleasant work environments for both teachers and children. Teachers and children are under less stress and learning occurs in a more relaxed atmosphere. Children are less likely to get lost in the crowd, and are more likely to have their own unique needs met by adults who have a better understanding of them as individuals. The extent to which teachers, aides, and children are friendly, supportive, and trusting of one another is an indication of the peer cohesion of children and the esprit de corps of the group as a whole (Johnston & Davis, 1989). Further this dimension is an indicator of classroom morale and sense of team spirit and is known to be characteristic of effective elementary schools.

Teacher Grouping Practices

Grouping practices of Project STAR kindergarten, first, second, and third grade teachers were explored through the use of the *Instructional Grouping Practices Questionnaire*. This self-report instrument asked teachers to report, in relatively low inference terms, information about the ways in which they arranged children in groups for instruction. Teachers were asked to report in what subjects children were grouped or a regular basis, the number of groups in reading and math, criteria employed in assigning children to groups, and the extent to which children were moved from one group to another during the school year.

Few differences were observed between K-3 small, regular, and regular/aide class teachers instructional grouping practices. Reduction of class size did not result in teachers changing their basic approach to teaching. K-3 teachers,

regardless of class type, continued to form small instructional groups for teaching reading; whereas math instruction was generally carried out with the whole class. Given Tennessee's highly structured, state mandated basic skills curriculum and concomitant teacher evaluation procedures, it is not surprising that traditional grouping practices for math and reading instruction are resistant to change as a result of reduced class size.

Project STAR K-3 teachers were most likely to employ three small groups for reading instruction and to teach math to the class as a whole group. While none of the differences were statistically significant, small and regular/aide class teachers more often used two or more groups for math instruction than did their regular class counterparts. Similarly, small class teachers more often reported using fewer reading groups than did regular or regular/aide class teachers, though again, the mean number of groups were not significantly different. Skill level was the primary basis for assigning children to reading groups, and most teachers (86%) reported that they occasionally moved children among groups throughout the year.

Summary and discussion. Project STAR kindergarten, first, second and third grade teacher responses to the *Instructional Grouping Practices* questionnaire provide no surprises. No significant differences in responses to the questionnaire items were noted among class types. As expected, almost all Project STAR K-3 teachers did group for instruction in reading; whereas only about a fourth reported forming instructional groups on a regular basis for teaching math. Also as expected almost no teachers formed instructional groups on a regular basis for teaching science or social studies.

Small class teachers averaged slightly fewer reading instructional groups than Regular class teachers. Regular/Aide class teachers have slightly more reading

groups than either Small or Regular class teachers. Small and Regular/Aide class teachers more frequently report using two or more groups for math instruction than do Regular Class teachers.

Children were assigned to reading groups based on their skill level. Since most math instruction occurs in a whole class, single group format, ability grouping is not employed. When teachers did group for math instruction, children were assigned to groups based on their skill level. It appears that when instructional groups are employed, as in reading, children are moved among groups during the year.

The picture that emerges from the Project STAR K-3 teacher responses on the *Instructional Grouping Practices* questionnaire supports the view that the fundamental organization of classroom instruction is not affected by significant reduction in class size or by the addition of full time teacher aides (Cahen et al., 1983, Mitchell et al, 1989). Some regular/aide class teachers did employ more groups for reading and math, and some small class teachers did form smaller groups for math instruction. On the whole, however, most teachers did not take advantage of smaller classes or teacher aides to change their basic approach to grouping for instruction.

As noted above, the presence of a highly structured basic skills curriculum in combination with a teacher evaluation system that is closely linked to adherence to the curriculum exerts strong pressure on classroom teachers to maintain traditional practices. Moreover, teachers received no training in alternative grouping approaches or instructional strategies related to new grouping possibilities. Thus, the effect of reduced class size or a full time teacher's aide in combination with focused. training and the opportunity for curricular modification is not known.

The Project STAR K-3 *Instructional Grouping Practices* questionnaire did not address the extent to which teachers employed temporary or ad hoc instructional groups. However, the K-3 teacher exit interviews indicate that small class and regular/aide class teachers reported making more frequent use of ad hoc instructional groups than they had when teaching in a regular size class. Moreover, regular class teachers did not report these differences during the exit interviews.

Parent/Volunteer-Teacher Interaction

Interaction between parents, volunteers and Project STAR kindergarten, first, second, and third grade teachers was examined using the *Parent/Volunteer-Teacher Interaction* questionnaire. This self-report instrument asked teachers to indicate the weekly, monthly, and yearly frequency of a variety of contacts with parents and other volunteers. Teachers were asked to report the nature, method, and weekly frequency of contacts with parents about their child's learning or behavior. The monthly frequency of a hierarchy of parent/volunteer involvement activities in the classroom was also measured. Teachers were asked to report the monthly and annual frequency of home visits; and to indicate their overall satisfaction with the level of parent-teacher interaction in their classroom.

Communication with parents. Teachers were asked to report the weekly frequency of contacts with parents about misbehavior or learning problems, and about good behavior or learning accomplishments. They were asked to recall how frequently during the past full week they had made phone calls, written notes home to parents, or held face to face conferences. In addition to communicating with parents about their child's behavior or academic progress, teachers were also asked to indicate the frequency with which they sent home suggestions for activities to be done at home, or information about topics of study. No significant differences were found among small, regular, and regular/aide

class teacher responses to these items; though small class teachers consistently averaged slightly fewer contacts with parent regarding pupil behavior or academic performance than did regular or regular/aide class teachers. Similarly, regular/aide class teachers averaged slightly more contacts with parents regarding classroom activities and ways that parents could support their child's learning at home than did regular class or small class teachers. Most teachers, regardless of class type, reported that within the past four weeks, four written communications about curriculum matters had been sent home to parents. This once a week pattern is consistent with general primary grade practice. Most K-3 teachers reported that they did not make professional visits to pupil's homes. No significant class type differences were observed for those teachers (between 10-15%) who reported making such visits.

Parent/Volunteer Involvement in the Classroom. Teachers indicated the monthly frequency with which parents or volunteers were involved in different levels of classroom activities. Teachers were asked about involving parents or volunteers in (a) maintenance tasks, (b) supervision tasks, (c) clerical tasks, (d) drill-teaching tasks, and (e) creative teaching tasks. No significant differences were found among small, regular, and regular/aide class teacher responses to these items. It should be noted that among K-3 teachers overall, regular/aide class teachers made slightly less frequent use of parents or volunteers than did small size or regular size class teachers. This finding is consistent with teacher interviews with regular/aide class teachers in which they explained that since they had a full time aide, they did not have as much need to involve parents or volunteers. For example, since regular/aide class teachers had a built in source of clerical assistance, it is not surprising they did not involve parents more frequently for this type of activity.

Summary and discussion. There appears to be neither significant differences nor readily observable patterns of differences in parent/volunteer-teacher interaction among small, regular, and regular/aide class teachers. Perhaps because the perceived need was greater, regular class teachers reported more frequent involvement of parents in classroom activities and support than did small or regular/aide class teachers. Throughout the K-3 grades it appears that having a full time teacher aide assigned to a teacher reduces the need for and hence the frequency of involvement of parents or volunteers in classroom activities. Another trend is that small class teachers appear more likely to phone, write, or confer with parents about pupil accomplishments and good behavior than are regular class teachers. Moreover, small class teachers report slightly less frequent communication with parents regarding pupil misbehavior or learning problems. One possible explanation for this finding emerges from the teacher interview data. Small class teachers report that they are better able to prevent problem behavior from happening, are better able to solve misbehavior problems in class, and have more time available to solve problems when they do arise. In short, small class teachers may have not felt the need to involve parents in solving classroom behavior problems.

Teacher Problems

In order to examine the relationship between teachers' perceptions of their work related problems and class type, Project STAR kindergarten through third grade teachers completed a slightly modified version of the *Teacher Problems Checklist* (Cruickshank & Myers, 1980). This instrument, modified by the addition of a single item regarding teacher aides, consists of 61 problem statements to which teachers respond on a five point Frequency scale (always, occasionally, never) and on a five point Bothersome scale (extremely, somewhat,

not at all).. Thus for each of the 61 specific problem statements, teachers provided information about the extent to which the problem was perceived to be bothersome and the frequency with which the problem was experienced.

No significant differences were observed between class type and teacher perceived problems. Project STAR kindergarten through third grade teachers, regardless of class size, problems related to Time were more frequent and more bothersome than other types of problems. The three problem statements: (a) I *have a problem having enough time to teach and also to diagnose and evaluate learning,* (b) *I have a problem having enough preparation time,* and (c)*I have a problem having enough free time,* were consistently observed to be the top ranked problems both for Bothersomeness and Frequency for all kindergarten through third grade teachers.

Discussion. The extensive literature on teacher problems (Veenman, 1984) strongly suggests that classroom management and control of pupil classroom behavior is the most significant problem area for teachers. The findings from Project STAR contradict this view of teacher problems, and indicate that problems related to time are the most frequent and bothersome work related problems perceived by these K-3 teachers. Other recent studies (Bainer, 1988; Hines Mann, Swarzman & Hogan, 1988; and Manaf, 1987) also report time to be the most prominent global area for elementary school teachers, and suggest it may be due to increased accountability expected of teachers. The ascendancy of time as the most troublesome problem area may be the result of a pervasive and salient focus on time and how best to use it in schools. Tennessee's basic skills curriculum is complex and teachers are held accountable for seeing that pupils progress through the specified curriculum at the expected rate. In many Tennessee schools teachers are accountable to supervisors and evaluators who step into their classroom and expect to find the teacher covering a particular unit, in a particular fashion, at a particular time.

Teaching Small Size Classes: Looking Beyond Achievement

Pupil achievement is understandably important to educators and policy makers. It is not surprising therefore, that pupil achievement has been the primary focus of most class size research and policy debate. Unfortunately, this narrow perspective on the class size issue has obscured and impeded consideration of other important questions that may be related to pupil achievement and satisfaction, teachers' satisfaction with their work and their work environment, and the cost of reducing class size.

The Project STAR teacher interview results have suggested a number of questions that must be answered before sound policy decisions can be made about optimal class size.

1. How is reduced class size or the use of full time teacher aides related to academic failure and grade retention of children in the primary grades? Shepard and Smith (1989) report that at the conclusion of the 1985-86 school year Tennessee teachers retained 3.9, 10.9, 5.1, and 3.1 per cent of kindergarten, first, second, and third grade pupils respectively. Does significant class size reduction affect the percentage of children retained? What is the cost of retaining a child in the primary grades? How does this cost relate to the cost of reducing class size?

2. How is reduced class size or the use of full time teacher aides related to pupil attendance? Monk and Ibrahim (1984) report that not only does pupil absence negatively affect the achievement of pupils who miss school, but pupil absence also negatively affects other pupils in the class. Results from the Project STAR interviews suggest that the quality of work life for pupils is more positive in small size classes than in regular size classes (Johnston & Davis, 1989). Is there a relationship between variables related to the quality of a child's early school experience and their attendance in school? What is the the cost of significant class size reduction in relation to effects, if any, on pupil absence?

3. Is there a relationship between a child's early school experiences in a small size class and the likelihood that they will remain in school through the junior high and high school years? Studies of early school experience, particularly studies of minority pupils and those considered to be at risk for school failure, suggest that early achievement has considerable effect on later school attendance and school dropouts (Berrueta-Clement, Schweinhart, Barnett, Epstein, & Weikart, 1984; Lazar, Darlington, Murray, Royce & Snipper, 1982). Is there a relationship between class size and the likelihood that pupils will graduate from high school? What is the the cost of significant class size reduction in comparison to the cost of pupils dropping out of school?

4. Is there a relationship between class size and referrals of children into special education services? Special education classes are an expensive item in school budgets. Do small class size teachers refer more pupils or fewer pupils into special education classes? Are teachers with a class of 25 first graders more likely to identify a low achieving pupil as learning disabled than are teachers in classes of 15 pupils? One position is that in a smaller class teachers are more aware of children who have genuine special educational needs, and hence special education referrals would be greater. The contrasting position is that a teacher in a regular size class might overlook the child who needs special education assistance. Still another perspective is that children who are low achievers or behavior problems in a regular size class of 25 or so pupils are more likely to be referred to special education classes because the teacher does not have the time to meet their specific needs and those of the other 25 children in the class. From yet another perspective, the Project STAR interview data suggest that small class size teachers have the time to provide these low achieving or disruptive children the attention they need to succeed. Again, what is the cost of significant class size reduction in comparison to the costs associated with providing special educational services?

5. What is the relationship between reduced class size and reduced teacher/pupil ratio and teacher work satisfaction? How does teacher effort affect pupil achievement and satisfaction? What is the relationship between teacher-pupil ratio and teacher effort? It is clear from the Project STAR interviews that teachers who were randomly assigned to small classes were much more satisfied with their work than were regular class size teachers. Teacher morale was higher, teachers were more willing to put forth the effort to do the things that they knew they should do to increase pupil learning and pupil satisfaction. Is there a relationship between class size and teachers' initiative or their sense of control? Can we reasonably expect teachers to make thoughtful and reflective decisions about curriculum and instructional strategies if they perceive that they are barely able to keep up with what is expected of them?

How does reduced class size or the presence of a full time teacher's aide affect teacher morale? Is there a relationship between teacher-pupil ratio and retention of teachers in the profession? One Project STAR small class size teacher who was nearing retirement told the interviewer, "If I could have a small class like this next year, I'd put off retirement!" Teacher retention is a difficult problem. The number of capable teachers who leave the field after only a few years of teaching is staggering. The continual training and induction of new teachers is an expensive proposition. It is well known that many prospective elementary school teachers are unwilling to enter teaching given the working conditions they must face (e.g., large classes, working largely in isolation from other adults, limited opportunities to use the bathroom, limited access and opportunities to use a telephone to conduct school business). How would teacher recruitment be different if class sizes were much smaller, or if full time aides were present in each classroom?

Is there a relationship between class size and the induction needs of beginning teachers? Just as the beginning school experiences are important for children's later school success, how would teachers' career-long development be affected by beginning to teach in a class with 15 students? How would this initial induction environment affect later skills, attitudes, and retention in the profession?

A new research agenda. Project STAR was a well designed and carefully controlled study of the effects of reduced class size and the effects of reduced teacher-pupil ratio on pupil achievement in the primary grades. This four year longitudinal study was conducted in a state with a uniform curriculum. Class size was significantly reduced or a full time teacher's aide was provided in a large number of classes representing all school populations. Teachers and children were randomly assigned to each of the three class types. No other changes were made. The results indicated statistically and educationally significant achievement gains for children in the small classes. In short, by itself, significant class size reduction resulted in significant achievement gains. Now it is time to move on. The matter of cost is an important policy issue; however more meaningful and accurate cost benefit estimates are not possible until more is known about the mid- and long-term effects of reduced class size on these and other variables.

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