A parallel argument holds for learning outcomes. If, for example, only school means in learning are considered, the chances of identifying class and group conditions decrease. Only to the extent that the effects of lower level conditions are pervasive will they become manifest in variation between schools (for example, if variation internal to schools is minimal). Indeed, conditions may operate specifically within one level—not necessarily the school level—and still be extremely important. Coverage, of course, is a good case in point. Accordingly, the aggregation of learning outcomes to the school level biases findings toward the identification of productive conditions at that level and against their discovery at lower levels.

The existence of distinct organizational levels in school systems increases the difficulty of discovering the effectiveness of conditions conducive to learning. Appropriate identification of their effects can only occur when they are specified according to organizational level and when there is variation in outcomes sensitive to those conditions. We must know enough about the productive workings to identify accurately the location of their influence. A condition that is actually the accumulation of several influences originating at various places in a school system—an inappropriately global measure—precludes a test of its real impact. Such aggregated outcome measures may conceal the variation needed to trace the impact of educational conditions on learning correctly.

While we promised in chapter 1 to treat the distinct organizational agendas of school systems at their respective levels, we have not yet delivered on that promise—but will shortly. Instead, we have taken the first step in showing that it is worth keeping. The previous analysis was carried out at the individual level only, but it provides persuasive evidence that there are indeed different sorts of things happening at each level. At best, it provides an armature around which an analysis of class organization, group instruction, and their impact on learning can be built. While we have reason to suspect, for example, that groups are organized on the basis of aptitude and that the pace of instruction is tied to grouping, we have not yet shown *how* these conditions are tied up with each other to constitute the internal workings of a school. We know, moreover, that learning materials are brought into the school system at the district level. Everyone recognizes that they are used in classrooms and in instructional groups, but we have not yet undertaken to show how. In sum, it is better to know where resources enter the system and how much they vary than not to, but it is better still to know how they are conjoined to constitute school production. We turn now to this latter question, and in the next chapter discuss how the distribution of aptitudes in classrooms gets tranformed into instructible grouping arrangements.

4. Social Organization of Classroom Instruction

A formulation of classroom instruction should identify the forms of instructional activity, the events that constitute it, and their extension over time. But what should be observed to understand how instruction works? One answer is *students* because students learn; they are the direct beneficiaries of instruction, however much they actually benefit. This answer leads to questions about how much time they spend working, how much time they spend with the teacher, what is their motivation; and about their experience with learning materials and in different classroom arrangements.

A second answer is *teachers* because teachers instruct. This leads to questions about their style of management, the nature of their discourse, and the way they ask questions, explain, sanction, supervise, and the like.

A third answer is *activities*, the joint engagement of teachers and students in carrying out curricular tasks, where activities include patterns of interaction, aspects of class organization, curriculum content, and the intellectual and social demands made by the nature of the schoolwork itself.

All of these are eminently plausible answers even though the apposite research does not inspire confidence. Beyond that, these answers are

conceptually questionable. Perspectives on instruction that stress individual experiences conducive to learning have largely ignored the organization of the classroom. Those that emphasize teaching have treated the characteristics and actions of teachers to be the same thing as class organization thus confounding teacher activities with the setting in which they occur. And those concentrating on activities have typically mixed class, group, social interaction, individual actions, and curricular demands in an undifferentiated conceptual jumble.

At this juncture, we find that a clear delineation of organizational levels—school, class, group, and individual—and the events that occur at each of them helps to sort out the elements of classroom instruction and establish connections among them. We need to ask: What is the nature of events occurring at each of these levels? It is perforce inappropriate to fasten on particular levels singly or to treat events occurring at several levels indiscriminately without tying them down to their organizational origins.

We will argue that the primary agenda of class level events is to establish a grouping arrangement in a class so that instruction can be undertaken. Teachers arrange classes in different ways by dividing them into groups, by setting each student to work independently, or by bringing all students together for a single activity. The purpose of these arrangements is to order students appropriately (in the teacher's eyes) so that instructional activities can then take place.

Once a class arrangement has been established, instruction can begin. Instruction, however, is a set of *activities oriented to the groups* established through the arrangement. Consider the illustration of grouped instruction commonly found in first grade reading. A teacher creates reading groups and then instructs them by having children read aloud and answer questions about stories. These activities are premised on the teacher having planned earlier for the group, provided appropriate textual materials, and set priorities for what skills to impart and for how much time to spend. Not only must this be done separately for each reading group that meets in its turn, but the teacher must provide instruction for the remainder of the class, usually by an assignment that can be managed by children independently and with only perfunctory supervision.

Instruction, then, entails the mixing of teacher and student abilities as well as materials over a period of time for groupings of children. And in the instance of grouped instruction, the class is divided into a small, intensive, teacher-driven component and a less intensive, largely self-paced individual seatwork component which succeed each other over time.

Comparing whole class with grouped instruction helps to clarify the distinction between a class arrangement and the instruction of groups.

In grouped instruction, the class is divided into visible parts, each one of which is then instructed. The difference between the class itself and the instructional group is palpable. In what is commonly and confusingly known as whole class instruction, the class is arranged as one single group that includes all children. That unit is then given instruction, recitation being a prime example. There is an optical and conceptual illusion that confuses the whole class, a classroom level entity, with the plenary group which is a unit of instruction. Although they both contain the same number of children, they do not have the same meaning organizationally. We must distinguish the class and its distributive properties from instructional entities which are derived from class properties, for the class itself is never a unit of instruction while a group the same size as the class can be.

In sum, classes are characteristically, though not exclusively, transformed into three types of arrangement: plenary aggregations, groups, and individually distinct members. These arrangements are respectively exposed to whole class, grouped, and individualized instruction which by definition takes place at the group level of organization. Note that we have used the term "group" here in a specialized—we trust not Pickwickian—way. When reading groups are employed, no stretching of the imagination is required in order to recognize that arrangement as grouped; even when whole class instruction is employed, that too can be readily understood as involving a very large group—one the size of the class itself. The contrasting limiting case is the thirty individual groups in a class of thirty receiving individualized instruction.

Classes of thirty, then, can be divided into single groups of thirty, thirty groups of one, and a variety of other combinations in between, such as three groups of ten. One must keep in mind that these groups are units of classroom organization (unlike classes, which are units of school organization) defined at an organizational level distinct from classes and located lower down in the school hierarchy. Conceptually, there is a world of difference between a class of thirty and an instructional group of thirty even when—indeed, especially when—they are both composed of the same children and the same teacher.

To round out the discussion, we note here the third aspect of classroom instruction: the individual student. To class arrangements and instructional activities designed for groups, children add their own abilities, interests, motivations, maturity, and perseverance and as a result learn. The situations of individual children and their resultant experiences are thus seen to be defined by class and group events as well as by the capacities that the children themselves bring to school.

In common usage, classroom instruction refers to all the things we have just described, but that usage conflates things that need to be distinguished. Note, too, that we have given instruction a technical

meaning referring to activities directed toward groups established within classes. To understand classroom organization, the first question must be asked about the class, not about the children as individual learners, not about activities. The reason is that the teacher must do something about the class, arrange it in some way so that instruction can begin. Once an arrangement has been established, the teacher then engages in instructional activities with the groupings created by the arrangement.

Grouping

While elementary school reading instruction usually employs ability grouping, grouping itself is part of the larger agenda of creating aggregations of students that are susceptible to instruction. Medieval schools, for example, according to Ariès, were characterized by "the lack of gradation in the curriculum according to difficulty of the subject-matter, the simultaneity with which the subjects were taught, the mixing of the ages, and the liberty of the pupils" (1962, p. 145). In due course, new institutions such as elementary schools appeared, and higher level schools became more internally differentiated. While we now take the age-graded school for granted, it is a relatively recent development. In the United States, graded schools appeared in the 1840s with "complaints about the difficulty of managing classes that contained a promiscuous assemblage of infants, boys, girls, large boys, big girls, young men and young women" (Kett 1977, p. 124). It also appeared in response to the feminization of teaching and to the financial economies attending it. "As long as schools were ungraded, it was difficult to justify the widespread use of female teachers, mainly because of doubts that tender ladies of 16 could manage plowboys of 18 in a classroom. Gradation, on the other hand, would permit the year-round employment of women, with older boys placed in high schools under male tutelage" (p. 125). Indeed, the classroom was an invention that replaced both the medieval schools and the later Lancastrian system with their large assemblages of students instructed at one time.

In the course of time, different aspects of the social grouping of classes became problematic for teachers: the size of the aggregation, its diversity in students' social and intellectual maturity, and the extent to which students possessed prior mastery of certain skills required by the curriculum. Various forms of ability grouping and tracking emerged in response to the problem of class and school diversity. For reasons difficult to explain, however, there appears to have been much greater interest in how grades get divided into classes than in how classes get divided into instructional groups. In both cases, moreover, the overriding question has been whether individual children assigned to homogeneously or heterogeneously composed classes or groups learn more.

Characteristic studies of grouping compare the learning of high ability children assigned to homogeneous classes to that of children of similar ability assigned to heterogeneous classes; and so on for average and low ability classes and children. This kind of design does not tell us about the nature of grouping, only about levels of individual performance related to membership in classes distinguished by ability in a grade or in groups distinguished by ability in a class.

Many studies indicate that grouping, presumably established to create more homogeneous classes than would appear if random class assignment were used, still results in considerable heterogeneity. Internal class diversity has been expressed as a problem of class overlap (Burr 1931), but this designation directs attention away from the instructional difficulties of teaching classes with wide ranges of ability and toward the assignment of children in a grade to the appropriate class, the latter being more an administrative than an instructional question.

In other ways internal class diversity has escaped attention. Both Barker Lunn (1970) and Daniels (1961), British writers interested in streaming, construe grouping within classes as a source of research design error, an obstacle to making clean comparisons between homogeneous and heterogeneous classes when the latter happen to employ grouping within the class. But by treating this phenomenon as error, they render it a nonproblem, at least in a substantive sense.

In one of the most important American studies, Borg (1965) explicitly indicates that ability grouping is often accompanied by different instructional treatments. In his own work he observes that a school district with classes distinguished by ability adjusts for differences among children by varying the rate of instruction. A contrasting district with heterogeneous classes adjusts instruction by enrichment. The distinction he draws between grouping and instruction is conceptually important; but once having made it, Borg ignores it empirically by failing to look for variations in rate or in enrichment *within* each school. As a result, the relation between within-class grouping and instruction does not arise as a problem.

Aside from the preoccupation in the study of grouping with the differences between homogeneous and heterogeneous groups, there has been a tendency for investigators to fixate on individual outcomes and experiences and to think about grouping simply as a way to cope with individual differences. We do not deny, of course, that individual outcomes are important and that groups do influence individual experience. But to conceptualize grouping exclusively in individual terms ignores its organizational character and the sequential processes by which children are assigned to schools, to tracks, to grades, to classes, and within classes to groups. Each successive assignment raises different problems of how to deal with student diversity, for example, by territory at the

school level and by age at the grade level. Children of the same age and in the same grade, moreover, differ by ability. And so the question arises of how the school manages grade-wide diversity so that instruction can be workable. Children can be assigned randomly or by some criterion such as ability. In either case, substantial diversity remains within classes, and one way or another teachers deal with it by using both organizational (like grouping) and instructional means.

In first grade, teachers characteristically employ ability groups for reading, but less characteristically do so for math. In both reading and math they must deal with class diversity—by using instruction geared to group differences or by using instructional variations adapted to whole class or seatwork formats. How well instruction is adapted to the whole class, to groups, or to individuals is an empirical question.

It is hard to understand why grouping inside classrooms has received as little attention as it has, especially because so much work, carried out as long ago as the 1930s (Burr 1931; Hartill 1936; West 1933) has shown persuasively that once grades are divided into homogeneously composed classes, substantial variation in ability remains in each class. How teachers deal with this diversity remains an intriguing issue. These early writers, it turns out, were not really interested in how schools or instruction worked, but rather tried to show that homogeneous grouping was not feasible because children grouped on one characteristic inevitably showed wide variations in others, and that in practice homogeneously grouped classes ended up overlapping in their distributions of ability. The difficulty for administrators in making defensible class assignments turned out to be the major agenda.

Our analysis of instructional grouping begins with the premise that grouping classes and instructing groups are entirely different things. The failure to draw the distinction has made it possible for partisans, for and against grouping, to praise it and condemn it. Ability groups, which are responses to characteristics of classes, we will argue, directly influence the design of instruction which in turn affects achievement. In modern elementary reading instruction carried out in primary classrooms, the abilities of students are treated as problematic and have given rise to the widespread use of instructional grouping. We pose a new question about ability grouping, one that is prompted by our broader formulation of schooling: How do the properties of a class influence the social arrangements that teachers design for reading instruction?

Organizing a class for instruction means transforming the initial distribution of some student characteristic, aptitude (or reading readiness) being the primary one. And as Kett's observations on nineteenth-century schools indicate, teachers also take such things as social maturity and obstreperousness into account because keeping the peace as well as providing instruction is part of their job. Teachers might take the class

as it appears on the first day as given, as not problematic, and treat the individual aptitude distribution as an appropriate grouping arrangement for instruction. Four teachers in our study, in fact, took this course—at least for a while—by starting the year with whole class instruction. At the other extremes, teachers might create thirty "groups" in a class of thirty by individualizing instruction completely. Most teachers find these arrangements inappropriate for first grade reading although they do employ them for arithmetic.

The usual response of first grade teachers to the initial class distribution of aptitude is to transform it by creating an arrangement of groups that have aptitude distributions different from the whole class and that are smaller in size. The question before us now is whether the properties of the initial distribution influence the nature of the grouping arrangement into which it is transformed. And if there is a connection between these two properties of classes—aptitude distribution and grouping arrangement—what is the nature of it? Consider some possibilities.

Class distributions of aptitude come in different shapes—concentrated, spread out, bimodal, asymmetrical—and grouping arrangements are constrained by these distributional properties. Given two classes, one dispersed and the other concentrated, the groups in the former will be spread out. Obviously, classes composed of abler children may not need as much intensively supervised instruction as classes composed of their less able counterparts. The former can learn more on their own, require less help, and thus prosper in large groups; their slower colleagues in contrast may need the close watching and support that smaller groups make possible. But if there are many low readiness children, one small group may not accommodate them. Two groups may be needed or perhaps one large one. Yet, teachers rarely start the year with more than three groups. If two are already used up accommodating a large contingent of low aptitude children, will one suffice for the remainder? Perhaps, if the remainder is not itself too diverse. But if two are needed for the remainder, will not a very large low aptitude group be difficult to teach, maybe almost as hard as the whole class? In short, the grouping arrangement, given the class distribution, is not cut from whole cloth.

Grouping is a scheme for organizing a class for instruction, not for instructing it. (Instruction, as we explain later in chapter 5, is a group phenomenon even when it involves all the children in the class at once.) We proceed now to an empirical investigation of how alternative grouping arrangements are shaped by the aptitude distribution of classes. In turn, we show how those initial arrangements become modified when they prove to be instructionally problematic to teachers over the course of the school year.

Class Distributions and Grouping Configurations

The Distributional Properties of Classes

We have argued that the most basic condition (although not the sole one) that teachers contemplate as they establish a program of instruction is the distribution of children's aptitudes; and because we are interested in reading, reading aptitude (or readiness) is most germane. This is so because teachers must find ways to adapt their talents, time, and resources to what children can do and to changes in what they can do if instruction is to be viable, and aptitude is an appropriate indication of such capacity.

Several aspects of the class aptitude distribution are relevant to the establishment of groups and their subsequent instruction. The first of these recognizes that aptitudes are dispersed more or less widely throughout the class. When children's aptitudes are widely dispersed, teachers will be pressed to make provisions for wider differences in instructional needs than they will if all children are just about the same. The standard deviation of class aptitude provides an indication of conditions requiring more or less diversified instructional approaches. Obviously, to identify a requirement does not mean it will actually be met; and some teachers do provide the same instruction for all children irrespective of their differences.

The second aspect recognizes that independently of aptitude dispersion, teachers confront conditions of distributional imbalance, that is, the presence of clusters of children with special needs at the top or bottom of a class. The skewness of aptitude, then, measures whether the distribution requires that the teacher attend to special interests and needs located asymmetrically in the class. It is a commonplace of teaching that aside from disruptive children, the ones who learn slowly for whatever reason are difficult to deal with.

The third aspect, the number of low aptitude children, superficially resembles positive skewness and represents a particular kind of instructional burden, the presence of large numbers of children likely to experience difficulty and to require substantial teacher attention whether the class is asymmetrically distributed or not. We maintain that the number and not the proportion is the better index; the more there are, the heavier the burden, and a small proportion in a very large class can represent a substantial number and create considerable difficulty for the teacher. By implication, a large contingent of high aptitude children is not so problematic. Able children can turn their brightness into ingenious disruption, but by and large, and with a modicum of planning, it is not too difficult to give bright children their heads because their basic mastery of the material is not usually in question.

Fourth, we consider the size of the class, for if classes are large, one or more of the groups is likely to be large. For some purposes and under some conditions, a large group is an instructional advantage while under others it is a liability.

An observant reader will have noticed, first, that two of the properties of class distributions pertinent to the formation of groups happen to be the familiar statistical moments and, second, that the first moment and the most familiar one—the mean—is missing. Standard deviation, skewness, and size all pertain in different ways to the spread of the distribution, to its diversity, which is what we believe teachers attend to as they form groups. The mean, however, denotes central tendency and theoretically should not help us understand the formation of groups, which are solutions to problems of diversity. Under conditions of whole class teaching, for example, knowing the mean might tell something about where teachers pitch the difficulty of instruction; that is, if all children in a class are slow learners, a teacher would not be likely to use advanced materials or to run through them quickly. (We will show in the next chapter that the mean aptitude of groups rather than of classes is indeed a major condition influencing the design of instruction.) But mean aptitude of the class does not tell us what is problematic for the teacher as far as group formation is concerned. Nevertheless, as we indicated in chapter 2, studies of educational effects frequently employ measures of school or class climate based upon the mean. Thus, for practical reasons pertaining to the current state of knowledge and to the contention of some investigators that the class mean really does have instructional importance, we include it; though from the perspective of our argument, its utility for understanding group formation is doubtful.

These five properties were determined for the fifteen classes in our sample in the following manner. Size was reported by teachers. Estimates of the aptitude distribution were based on the random sample of children drawn from each class, as described in chapter 3. Class means, standard deviations, and skewness were calculated using conventional procedures. The number of low aptitude children was determined by the number in each class sample scoring below 25 on the Word Learning Tasks (approximately 30 percent of the total sample; see appendix D for the distribution of aptitude).

(We must note parenthetically that these same distributional indices are relevant to other levels of school system organization—district, school, and instructional group—and that in each case their meaning differs depending on the organizational agenda of these other levels.)

Group Formation

When teachers establish reading groups, they transform the aptitude composition of the class; for that reason, we must keep in mind the

distinction between the properties of groups and those of classes. The reason for reorganizing a class is to make it easier to manage, to make it easier to teach, and/or to make instruction more effective (or apparently so). According to the conventional wisdom, the standard way to do all these things is to teach aggregations of children that are smaller than whole classes. Once teachers reach this conclusion, the alternatives before them become not only limited in number but collectively constraining.

First, teachers must determine the *number* of instructional groups. The class as a whole might be treated as an instructional unit (uncommon for reading, but common for math) or else divided into groups. But into how many? The number will be constrained by the size of the class but, more importantly, by practical considerations related to the number of distinct preparations the teacher must make and to the difficulty of supervising the large class remainder left over when the teacher is instructing a small group. The more groups, the smaller the size of each and the larger the remainder. One rarely finds as many as five or six reading groups. Experience and tradition characteristically limit the number established at the beginning of the year to three, sometimes two or four.

Having determined the number of groups, a teacher must decide upon *relative group size.*Groups may all be equal, or some may be large while others are small. We expect that such varied considerations as the management capabilities of the teacher and the number of books available may constrain the maximum size of groups. But in keeping with our presumption that children with low aptitude are hard to teach, we expect that if teachers form groups of unequal size, the one composed of low aptitude children will be smaller than those with abler children. But that may depend on how many low aptitude children there are; for if there are many, a small group may not accommodate them all.

Finally, teachers can vary the *discreteness* of groups, the extent to which aptitudes do not overlap group boundaries. In a class of two groups, for example, the low group may be composed of children only from the lower end of the aptitude range and the high group only from the upper end. In a class with completely overlapping groups, by contrast, each one reflects the distributive properties of the class—a case of heterogeneous grouping in which only the size of instructional units but not the distribution of the class is transformed. Teachers who want to work with groups smaller in size than the whole class, but who are not overly concerned about decreasing its diversity, will not form discrete groups. Most teachers, we expect, form groups that overlap, partially because children's characteristics other than aptitude, such as work skills and motivation, are taken into account. Furthermore, aptitude might be difficult to assess accurately in a collective setting particularly at the beginning of the first grade.

The alternatives available to teachers in forming groups—the number of groups formed, whether they are of equal or unequal size, and their discreteness—characterize the group configuration of classes. Classes, then, may be described not only by their distributive properties, but also by the configuration of groups composing them. The configurational properties assume particular importance because of their implications for the design of instruction.

The number of groups is important because it affects the proportion of time a teacher can allocate to their direct and intensive supervision and to the relatively unsupervised seatwork undertaken by the remainder of the class. For example, in classes meeting for the same length of time, one with two groups has equal amounts of time allocated to seatwork and supervised small group instruction while one with four groups has three times as much allocated to seatwork as to small group instruction. Groups b, c, and d must simply wait their turns doing seatwork while the teacher is busy with group a. The number of groups, then, influences the trade-off between direct instruction and seatwork.

The relative size of groups in a class can be important for instruction, particularly if the small group contains children of low aptitude. It should be easier to provide appropriate instruction for fewer than for more such children because each child has a greater opportunity to participate in instruction and to receive support and guidance. Although small group size might also enhance the learning of brighter children, they are better able to cope with less optimal conditions. For that reason, we would not expect to find much benefit from smaller group size among learners of average or higher ability.

Although the discreteness of groups has only indirect implications for instructional design, it bears directly on how much groups differ from each other in average ability, as indicated by the range of group means. Teachers do not differentiate instruction much in overlapping groups that by definition do not differ greatly in composition. By contrast, discrete groups differ more in mean aptitude and perforce in the instruction designed for them. The range of group means, influenced by discreteness, provides an estimate of how varied the instruction of groups within a class is expected to be. As a class characteristic, the range bears a direct relation to a group level property: namely, the group mean aptitude, which we argue in the next chapter is the main characteristic toward which teachers gear their instruction.

We have discussed here two orders of class properties: first, characteristics of the aptitude distribution; second, aspects of classroom grouping arrangements. The former order is straightforward, the latter more complex. We have indicated that the grouping arrangements of *classes*

differ in the number of groups formed; in whether the groups are of equal or unequal sizes; and in the extent to which they overlap in aptitude, which influences the range of group means. Most importantly, these are not group designations but class properties defined by the configuration of groups composing the class.

To calculate these indices of grouping configuration, we first estimated the size and distributive properties of groups within classes. The group membership of each child in the sample was determined by asking first grade teachers to report the group in which each was instructed in December and May of first grade. From this information, we estimated the size and aptitude characteristics of instructional groups. For example, as shown in table 4.1, seventeen out of thirty-seven children in class 01 were studied. Four of these were in the low group, six in the middle group, and seven in the high group. These numbers constitute the random samples from which the actual group sizes were estimated; nine, thirteen, and fifteen, respectively, and similarly for groups in the other classes (appendix B contains sample and estimated group characteristics for the fall). Whereas the sample sizes provide good estimates of group size and mean aptitude, they are too small in some cases to yield reliable indices of other distributive properties (the higher statistical moments). Nevertheless, estimates of group variation were used in aggregated form to determine the degree of discreteness in the composition of groups.

The calculation of the indices of group configuration is shown in appendix E. The number of groups in classes ranged from one to four. The Size Inequality Index ranged from 0.00 to 10.00, with low values indicating classes with groups of nearly equal size. Values for the Discreteness Index ranged from −0.46 to 1.00. (See appendix E for an explanation of the anomalous negative values of this index.) The range in values from 0.65 to 1.00 refers to instructional groups that tend toward discreteness, while the range from 0.20 to 0.64 indicates moderate degrees of overlap. Low values, especially the negative ones, indicate high overlap among groups. And as for Group Range, the differences in mean aptitude between the highest and lowest groups in the classes varied from 12.00 to 51.33 for December grouping patterns.

Linkages between Class Distributions

We can now rephrase our question about the influence of class properties on grouping patterns in precise terms: How do the size and distributive properties of classes influence the number of groups formed by teachers, their relative size, their discreteness, and their range in mean aptitude?

What conditions influence a teacher to form more rather than fewer instructional groups? Three class properties are plausible candidates. The first is the size of the class. In first grade reading, it is easier to plan

instruction for and manage smaller rather than larger groups. In classes with the same number of groups, the larger the class, the larger the groups within it. If smaller groups are desired, larger classes will contain more groups on the average than smaller ones.

Second, over and above class size, diversity will lead to more groups if teachers try to increase group homogeneity.

Finally, more groups will be formed when a class contains a large contingent of low aptitude children in order to accommodate better their instructional needs.

What class properties might lead a teacher to form groups of unequal size? As previously suggested, small groups are likely to be established to accommodate low aptitude children. Yet the shape of the class distribution should influence whether small groups will be feasible. To help think about this issue, visualize several class distributions including a positively skewed class containing a predominance of low aptitude children, a negatively skewed class with many able children, and a normally distributed class. In normal (symmetrical) and negatively skewed classes, creating a small group can markedly decrease the heterogeneity of the low end of the distribution. It can have only a minor effect in decreasing heterogeneity in positively skewed classes because the low aptitude children are numerous and thickly bunched together; hence creating a small group does little to decrease the existing narrow variation at the bottom of the class. In the negatively skewed class, the spread over the lower tail of the distribution is very wide; a small group narrows the diversity more than a large one does; and while the remaining diversity is still large, it can be managed in a group of small size. We therefore expect to find unequal sized groups in classes *not* burdened by a large number of low aptitude children because in this situation the small low group provides the remedies of small size and homogeneity.

In classes containing many such children, a small low group does not help the teacher manage the whole low aptitude burden. It will accommodate a portion of it, but a substantial low aptitude contingent will remain. In effect, the crowded bottom of the class is already homogeneous and numerous, and a small low group fails to relieve the problem of numbers and forces the creation of highly diverse groups farther up the scale. Small low groups are only advantageous at the bottom when the class is normally distributed or negatively skewed—conditions with only a few low aptitude children to begin with.

We suspect that the overlap among groups may arise only in part by design. It may partly be a function of the difficulty teachers face in accurately assessing aptitude; it may also occur, not as a response to class properties, but from teacher preferences for similar groups that equalize the instructional experience of their members. In homogeneous classes, aptitude differences are less distinct and the same instruction

may be appropriate for many children; hence, whether or not the groups overlap much may not matter. The opposite is true for diverse classes, which are likely to be characterized by discrete groups and highly differentiated instruction to accommodate the range of aptitude differences.

The range among groups in mean aptitude should directly reflect class diversity. Classes composed of students differing widely in aptitude (large class standard deviation) should then on the average yield groups characterized by very different means. Nevertheless, the degree to which groups are distinct in composition also has a bearing. One can imagine a highly diverse class divided into two completely overlapping instructional groups with little difference between them in mean aptitude. Our argument, however, is that diversity supports the creation of groups that overlap relatively little with the result that the groups differ markedly in mean aptitude. We turn now to the empirical examination of group formation.

Initial Grouping

Class Properties

Table 4.1 shows that the fifteen first grade classes differ considerably in size, with the smallest in school C and the largest in schools A, B, and F. Classes also differ in their distributional properties. Mean aptitude varies within schools as well as among them, with the greatest range of class means appearing in school F. Only a few classes are narrowly dispersed, and these tend to be relatively low in average aptitude as well (classes 02, 04, 06, and 15).

Clear differences exist in skewness, particularly in school F where classes reflect a modified grade-wide pattern of ability grouping for reading instruction. Class 13 contains a large cohort of the most able children in the grade along with a small contingent of the least able. Class 14 includes the next ablest segment of the grade distribution with another small group with low aptitude, and class 15 contains the low-middle range of the grade. This special form of ability grouping helps to account for the unusual combination of distributive properties found in school F classes.

Classes differ markedly in the number of low aptitude children. To some extent the number reflects total class size; obviously, larger classes might be expected on average to include a greater number of less able children. However, the proportion, as well as the absolute number, is higher, more so in the classes of schools A, B, and D than in the others. In keeping with our assumption that low aptitude children represent a heavy instructional burden, we view these classes as potentially more problematic than those with fewer. If grouping configurations are responsive to the character of classes, we would expect to see different

TABLE 4.1
Distributional Properties of Classes

District	School	Class	Actual Size	Sample Size	Children's Aptitude			Number of Low Aptitude Children	Number of Groups	
					Mean	Standard Deviation	Skewness		Fall	Spring
I	A	01	37	17	40.47	21.34	−0.06	11	3	3
	B	02	35	13	25.54	10.13	0.99	19	3	4
		03	36	18	36.94	17.03	0.49	8	3	4
		04	30	6	32.50	14.61	0.51	10	2*	2
		05	35	8	29.50	18.59	1.53	22	3	3
II	C	06	20	6	34.00	11.85	0.32	3	2	2
		07	20	6	46.17	20.18	0.25	3	1	2
		08	19	7	43.43	16.21	0.73	0	1	2
	D	09	27	12	35.92	20.24	0.75	9	3	3
		10	27	8	37.63	26.85	0.63	17	3	4
III	E	11	28	7	38.29	18.40	0.74	4	3	4
		12	29	9	40.89	20.73	0.48	6	2	3
	F	13	37	8	53.38	21.08	−1.16	9	2	2
		14	33	14	44.14	18.76	−0.10	7	3	3
		15	36	8	31.63	13.14	0.98	14	1	2

* These are two first grade groups. Class 04 also had one group of second graders.

grouping arrangements in classes containing many rather than few low aptitude children.

Class Properties and Number of Groups

Table 4.1 also shows that teachers differ in the number of groups they form in the fall, from one to three. Most have three groups (classes 01, 02, 03, 05, 09, 10, 11, and 14), while some employ total class instruction (classes 07, 08, and 15) or establish two groups (classes 04, 06, 12, and 13). Table 4.2 shows that class size and the number of low aptitude children are moderately related to the number of groups, approaching but not achieving statistical significance.

By contrast, class mean, standard deviation, and skewness of aptitude are much less strongly related to the number of groups formed. We did not expect the mean or skewness to be associated with the number of groups; but if groups do perform the function of reducing class diversity, it is reasonable to expect more groups in highly diverse classes. However, we find no such relation. On the basis of these findings we suggest that the sheer number of children in a class more than their dispersion influences the forming of a workable grouping arrangement for first grade reading instruction. However, class differences in aptitude are important, but at the lower end of the aptitude distribution. That is, the number of groups formed reflects more the numbers of children in the lower end of the aptitude distribution than the total spread of aptitude, the mean class level, and skewness.

TABLE 4.2
CORRELATION COEFFICIENTS BETWEEN CLASS DISTRIBUTIONAL PROPERTIES AND THE NUMBER OF INSTRUCTIONAL GROUPS FORMED IN DECEMBER (n = 15)

Class Distributional Properties	Correlation Coefficients
Class Size	0.46
Children's Aptitude	
Mean	−0.28
Standard Deviation	0.25
Skewness	0.09
Number of Low Aptitude Children	0.46

Levels of significance: 0.05: $r > 0.50$.

Grouping Types

The characterization of grouping arrangements by the number of groups formed, although perhaps representing the most significant feature of the grouping pattern, fails to capture the different ways in which arrangements are employed. All classes with three groups—low, middle, and high—represent a conventional form of aptitude grouping. Less conventional arrangements are found in the three classes of school C, two of the three classes in school F, and classes 04 and 12.

In school C, two classes are not subdivided, while the third is divided into two equal groups. Does this represent two different patterns within the same school? We think not. Our data portray the grouping pattern found in December; but we know from interviews that class 06 had one group of twenty children only a few weeks before the data were collected, and that classes 07 and 08 were going to split early in January. (Spring data indicate that they did.) Thus, we find all classes in school C beginning the year with whole class instruction, then splitting in the late fall or early winter into two groups. Only the timing of the split distinguishes the three. Thus, class size appears to have direct consequences for the number of groups established, and also seems to influence whether grouping occurs at the beginning of the year or is delayed.

In school F, instructional groups vary in number. The two classes of able children with a few less able ones are grouped along aptitude lines. The third class (15), to which middle aptitude children were assigned, operates as a single instructional group. It is clear that the special distributional properties of these classes affect the number and size of instructional groups.

The remaining schools follow a traditional arrangement. Even class 12 appears to be similar in organization; while only two groups are established initially, three are used by spring. Class 04 is an exceptional case—a split grade 1 and 2 class. Fifteen of the thirty class members were first graders, and the teacher grouped them into two groups (we have assumed that one group was used for the second graders, for a total of three groups). The teacher, experiencing her first year on the job, attempted to group the first graders on the basis of ability and therefore is properly classified with the other teachers in school B as following a traditional grouping arrangement.

In sum, represented in our sample are three distinct types of grouping. School C classes are characterized by delayed grouping and class patterns consisting of no more than two groups (delayed grouping). School F classes employ a modified ability grouping of the whole first grade into classes, followed by instructional grouping within classes (grade-wide grouping). Finally, the classes in the remaining schools reflect patterns of traditional ability grouping (traditional grouping).

TABLE 4.3
ANALYSIS OF VARIANCE OF CLASS DISTRIBUTIONAL PROPERTIES: CHILDREN'S APTITUDES BY GROUPING TYPE

Class Distributional Properties	Means of Group Types					
	Delayed (C)	Grade-wide (F)	Traditional (A,B,D,E)	Grand Mean	F Ratio	Significance Level
Class Size	19.67	35.33	31.56	29.93	17.62	0.00**
Children's Aptitude						
Mean	41.20	43.05	35.30	38.03	1.95	0.18
Standard Dev.	16.08	17.66	18.66	17.94	0.38	0.69
Skewness	0.43	−0.09	0.67	0.47	2.04	0.17
Number of Low Aptitude Children	2.00	10.00	11.78	9.47	3.87	0.0506[a]
Number of Classes	3	3	9	15		

* $p < 0.05$. ** $p < 0.01$. [a] Closely approaches significance.

Table 4.3 shows the findings from the previous correlational analysis presented as an analysis of variance comparing the three types of grouping according to their class properties. The three are not distinguished by the mean, standard deviation, or skewness of class aptitude. Only class size and the number of low aptitude children distinguish the delayed grouping type from the others.

The correlation between class size and grouping type suggests that teachers of small classes may initially avoid ability grouping, while teachers of large classes may be constrained to group from the beginning of the school year. Perhaps teachers of small classes find it possible to give children who experience difficulty sufficient support without creating a separate group for them.

In any event, this analysis provides evidence supporting the relation between class size and type of grouping pattern. But while the number of low aptitude children in school C classes is considerably smaller than that in most of the other classes, school E classes have a limited number of low aptitude children but still employ traditional grouping. This suggests that a small number of low aptitude children does not necessarily lead to delayed grouping. The proper interpretation of the findings is probably that unusual forms, such as delayed grouping, may only be feasible when optimal conditions of classes—such as small size and few low aptitude children—prevail. In short, teachers can exercise options, but which ones they take will depend on the congeniality of other conditions.

We turn now to more detailed analysis of the relations between class properties and grouping arrangements. We consider the three types of grouping separately, beginning with the classes in schools C and F, and then turning to the traditionally grouped classes, treating them as exemplary case studies.

Delayed grouping. The three teachers in school C began the year with total class instruction. Class 06, the first to be divided into groups, can be distinguished from classes 07 and 08 by its lower mean and standard deviation, but not by its skewness, or number of low aptitude children. As table 4.4 shows, classes 06 and 07 are divided on the basis of ability as indicated by the moderate to high indices of discreteness. By contrast, the discreteness coefficient of 0.00 for class 08 indicates that groups are not formed on the basis of ability; instead each reflects the distributional properties of the class. As a result, the range of group means is considerably smaller in class 08 than in the other two classes—this in spite of the greater variation (standard deviation) among class members in class 08 than in class 06 (shown in table 4.1).

In addition to using only two groups, teachers in school C form groups of equal or nearly equal size as indicated by the [illegible] index. From arguments made earlier we would not expect equal sized groups in

such normal class distributions. It appears that the grouping arrangements in school C are governed by the preferences of teachers and made possible by favorable class properties (small size, few low aptitude children). Interviews with teachers in school C indicated that they tried to equalize the learning experiences of children as much as possible out of concern that children would make invidious comparisons among themselves related to group placement. The initial employment of whole class instruction conforms to their preference for the equalization of experience. However, in two of the three classes, once grouping occurred, it was based on aptitude. Only teacher 08's groups appear to decrease group size without decreasing aptitude dispersion—a case of heterogeneous grouping. When grouping does appear in the late fall and early winter, it takes an unusual form: two large instructional groups rather than the more customary three.

We also note, however, that the three classes have standard deviations comparably as large as those found in the other schools, indicating that the teachers had to confront the problem of diversity in the distribution of aptitude. Not surprisingly, they created instructional groups.

Those who believe in ability grouping would find sufficient variation in school C classes to create groups. Those objecting to it, like teachers 06, 07, and 08, find opportunities first to delay grouping and then to institute a pattern that represents concessions both to the reality of a diverse aptitude distribution and to their preference for the equalization of children's experiences.

Grade-wide grouping. Teachers regrouped the first graders in school F for reading instruction into two bimodally distributed classes and one containing the low-middle range in aptitude. As might be expected on the basis of its distribution, class 13 was divided into two instructional groups corresponding to its patently bimodal concentrations of children—a very large high and a very small low group. Its index of discreteness is therefore extremely high and the groups are characterized by widely separated means as shown in table 4.4. The size inequality index is also high.

Class 14 has a similar bimodal distribution, although the children are slightly less able. The teacher, like teacher 13, formed groups of unequal size, but with one large high group and two very small lower groups. While this arrangement of groups fits the class distribution, one would not necessarily expect to find high overlap in aptitude as indicated by the low index of discreteness (table 4.4); yet an inspection of individual placements reveals that some low aptitude children are placed in the high group. For this reason, the means of the groups are more alike than would be expected on the basis of the distributional properties of the class. The high group, because of its wide aptitude dispersion, would not appear to be viable, and indeed, we find that in the spring of the

TABLE 4.4
CONFIGURATIONAL PROPERTIES OF CLASSES IN SCHOOLS C AND F, FALL AND SPRING

		Fall				Spring			
School	Class	Number of Groups	Size Inequality	Discreteness	Range of Group Means	Number of Groups	Size Inequality	Discreteness	Range of Group Means
C	06	2	0.00	0.50	15.34	2	0.00	0.50	15.34
	07	1	—	—	—	2	0.00	0.74	31.00
	08	1	—	—	—	2	1.50	0.00	6.25
F	13	2	9.50	0.98	43.83	2	9.50	0.98	45.33
	14	3	10.00	0.00	29.18	3	5.33	0.13	33.20
	15	1	—	—	—	2	8.00	0.00	3.75

year some of the low aptitude members of the high group are transferred to another group. (Group change and transfer are discussed in greater detail later in the chapter.)

Class 15, characterized by the lowest mean and the smallest standard deviation, includes children spanning the middle aptitude range of the grade. Teaching this class as a single group is not expected to be workable because of the large number of low readiness children; not surprisingly, two groups are formed later in the year, suggesting that instructional problems resulted from treating the class as a single group.

The teachers in school F use a modified aptitude grouping plan. Its use is not predictable on the basis of the school's distributional properties and therefore must be attributed to administrator and/or teacher preferences because there are obviously alternative ways to accommodate a similar grade-wide composition. Nevertheless, once classes are established, the number and relative size of their groups are predictable with the exception of class 15, where two initial groups might have been expected rather than one.

Traditional grouping. All classes using traditional grouping (01, 02, 03, 04, 05, 09, 10, 11, and 12) are large. They differ considerably, however, in mean aptitude, standard deviation, skewness, and number of low aptitude children, as table 4.1 shows. While teacher preferences unrelated to class distributional properties might account for the early employment of conventional grouping, compared to its delayed use in school C classes, class size stands out as the single most important and plausible determinant of early grouping. Large classes evidently pose problems of management; so does a large contingent of low aptitude children. Grouping is a workable arrangement for both eventualities.

Given traditional grouping, do the distributional properties of the class influence grouping arrangements? With respect to the number of groups, only in class 12 did the teacher divide children into two groups; in all other classes, a three-group autumn pattern was used. Accordingly, there is insufficient variation in the sample to test the influence of class size on the number of groups.

Earlier we speculated that the use of small low groups might occur in normally distributed classes but not in those containing large numbers of low aptitude children. Our nine classes cluster into two groups: those with many low aptitude children (02, 05, and 10) and those with few (01, 03, 04, 09, 11, and 12), as shown in table 4.1. To appreciate the magnitude of the burden in the first three classes, notice that the low aptitude children constitute from 54 to 63 percent of total class enrollment.

The three classes containing very large numbers of such children are characterized by equal sized groups as indicated by the low inequality index reported in table 4.5. Only one other class, 12, is characterized by

an inequality index under 2.0. We have no explanation why a teacher with a normally distributed class might form equal sized groups. Except for class 12, classes with fewer low aptitude children contain groups of unequal size. Further, in every case, the smallest group is composed of low aptitude children. This preliminary analysis indicates, then, that the relative size of groups is related to the number of low aptitude children in the class.

We argued that the discreteness of groups reflects the aptitude dispersion of a class. Four are characterized by high standard deviations: 01, 09, 10, and 12. Their discreteness scores range from 0.65 to 1.00, indicating highly discrete groups. Table 4.5 shows that all four classes with high standard deviations also contain groups that did not overlap much. The teacher of a fifth class, 05, also formed highly discrete groups even though her class was only moderately dispersed (st. dev. = 18.59). Generally, it appears that teachers group highly varied classes into more discrete groups than is true for less dispersed classes; however, discrete grouping can appear in less varied classes, as illustrated by the pattern of teacher 05.

The dispersion of the class is also manifested in the aptitude range between top and bottom groups as shown by three of the four dispersed classes characterized by a wide range of group means; class 09 represents the exception. Class 05 is also characterized by a wide range of group means even though its dispersion falls in the moderate range. This case demonstrates that the degree to which groups overlap directly influences the range of group means. Reciprocally, even in a highly varied class, a teacher who forms highly overlapping groups can diminish the differences among groups. Class 09 is characterized by a borderline discreteness score (0.65), and this may account for the narrower range of group means than expected on the basis of class dispersion.

To test more systematically the relation between class and grouping properties for traditional grouping, zero-order coefficients were calculated as shown in table 4.6. The correlational results generally confirm the prior observations. The number of low aptitude children is related to the relative size of instructional groups at a statistically significant level; no other class properties are associated with size inequality. The standard deviation of classes bears a substantial, but nonsignificant relation to the discreteness of groups and a statistically significant correlation with the range of group means. No other class properties bear a substantial association with discreteness or range of group means.

Two observations about grouping need emphasis. The first pertains to the relative size of groups and the second to the nature of overlap among them. In almost every case where a relatively small group appears in a class, it is composed of low aptitude children. This means that the size inequality index reflects the smaller size of low groups. The relative

TABLE 4.5
Configurational Properties of Classes in Schools A, B, D, and E, Fall and Spring

School	Class	Fall: Number of Groups	Fall: Size Inequality	Fall: Discreteness	Fall: Range of Group Means	Spring: Number of Groups	Spring: Size Inequality	Spring: Discreteness	Spring: Range of Group Means
A	01	3	2.23	0.75	41.21	3	7.77	0.64	32.32
B	02	3	0.90	0.17	12.00	4	2.25	0.02	14.50
	03	3	5.33	0.64	34.39	4	3.00	0.52	36.36
	04	2	5.00	0.23	15.75	2	5.00	0.01	12.75
	05	3	1.77	0.83	40.17	3	1.78	0.40	28.67
D	09	3	4.67	0.65	31.17	3	8.00	0.07	21.00
	10	3	1.33	1.00	51.33	4	1.88	1.00	54.00
E	11	3	4.44	−0.46	21.50	4	1.50	0.49	35.50
	12	2	1.50	0.93	37.46	3	2.44	0.75	44.75

size of groups is not determined solely by the distribution of class aptitude; it may also reflect teacher preference for a small low group, when the distributional character of a class permits, because of the greater ease in dealing with low aptitude children in smaller groups.

Among those teachers who composed groups that overlapped in aptitude, two major types of arrangement were observed. The first involved the formation of two groups composed of children from the same portion of the class distribution. For example, teacher 10 formed two highly overlapping groups at the lower end of the class. This pattern suggests that she saw these children as sufficiently alike to profit from the same instructional program, but still created two groups in order to reduce group size, most likely to manage them more easily. Fewer children per group allow the teacher more time to interact with each and to identify and remedy the problems each one encounters during instruction.

The second type of overlap involves placing low aptitude children in middle and high groups. High aptitude children are never placed in low groups. Groups in classes 11 and 14, and to a lesser extent in class 02, are characterized by this sort of overlap. How can we understand it? One possible explanation is that some teachers have difficulty assessing children's aptitudes accurately, especially low aptitudes. Alternatively, they may consider other characteristics than aptitude in forming groups. For example, we can imagine placing children with good work habits and social adjustment in a higher group than expected simply on the basis of aptitude.

Three major conclusions can be drawn from this examination of the relations between class conditions and group patterns. First, class size is a determinant of the number of groups. However, this relation appears to be mediated by the type of grouping scheme teachers use. Further, the nature of the relation is conditional. While small class size permits teachers to group pupils according to preference, large class size is associated with traditional patterns of ability grouping.

TABLE 4.6
Correlation Coefficients between Class Distributional Properties and Indices of Group Configuration in School A, B, D, and E Classes (n = 9)

Class Distributional Properties	Number of Groups	Size Inequality	Discreteness	Range of Group Means
Class Size	0.28	−0.16	0.11	0.05
Children's Aptitudes				
Mean	−0.15	0.20	0.22	0.54
Standard Deviation	0.12	−0.16	0.56	0.89**
Skewness	0.23	−0.21	−0.09	−0.14
Number of Low Aptitude Children	0.35	−0.62*	0.35	0.18

* $p < 0.05$. ** $p < 0.01$.

Second, the dispersion of a class is closely related both to the degree of discreteness among groups and to the aptitude range of group means. Further, discreteness and the range of group means are conditionally linked so that an increase in overlap among groups decreases the range of group means in a class. Generally, however, most grouping is based on pupil aptitude, and the aptitude of most children, particularly those in the middle and high portions of the distribution, seems to be accurately assessed.

Finally, a large concentration of pupils in the lower end of the class distribution is associated with equal sized groups. By contrast, teachers of more normally distributed classes have the option of forming either equal sized groups (which means a large low group) or a relatively small low group. Again, we see a conditional relation of a special sort: a more optimally composed class permits teachers to exercise their preferences, while less optimal conditions constrain teachers toward a single solution.

We have gained some understanding of the determinants of initial grouping patterns. An important further question is whether the initial grouping scheme remains satisfactory beyond the beginning of the year, and this question leads us to examine patterns of group change and of individual change between groups.

Changes in Grouping from Fall to Spring

The description of fall class and instructional group characteristics provides a sense of how teachers initially organize classes to cope with the distribution of children's aptitudes. They begin the school year with little to go on in establishing a basis for group organization. Our evidence indicates that they take certain class characteristics into account, but that group formation in its particular manifestations is not determined in any direct way by the distribution of class characteristics.

Groups established during the fall of the school year are by no means static; they change over time as does their membership. They change in number, in size, and in membership to the extent that they gain members from and lose them to other groups. School and class size and their distributional properties did not change in our sample from fall to spring; accordingly, the changes we observe pertain only to instructional groups.

When new groups are added and change in size, children must obviously have been transferred from one to another. Nevertheless, group change must not be construed solely as the transfer of individual children. While it has an important individual component, both group and class considerations are also involved. Groups or classes having certain properties may have a greater susceptibility to change than others with different properties. Thus, individuals transfer; and groups form and split. Transferring individuals may enter existing groups, possibly

changing the latter's size and composition, or they may constitute a new group. Accordingly, to understand individual transfers, we look at the characteristics of individuals; to understand group change, we look at properties of classes and groups.

Individual Transfers between Instructional Groups

The analysis of individual change pertains to classes in all schools except C because the latter's classes have properties that make an analysis of individual transfers inappropriate. As indicated earlier, classes in school C all started the year with whole class instruction, a pattern that yielded, between late fall and early winter, to grouped instruction with only two groups in each class. In our judgment, it would be incorrect to treat the division of those three classes as involving the transfer of individual children. Rather, each class was divided. Once established, the group membership remained stable. Moreover, we suspect that transferring children between groups would have been contrary to teacher preferences, indicating by implication that the groups were different and that children would get an instructional experience in one group that was unavailable in another.

Table 4.7 shows the percentage of children in each class of schools A, B, D, E, and F who remained in their initial group or changed from one to another. Based upon the number of sampled children (n = 128), the table shows aggregate patterns of transfer (class specific): the percentage of the children who remain in their original group, who move upward, and who move downward. Note that in school F, some children transfer between groups within their original class while others transfer by moving to another class.

On the whole, more children remain in their original fall group for the whole year (about 70 percent) than change although there is substantial variation by school and by class. Three classes show an extremely high percentage of children changing groups: classes 04, 11, and 14. (It is difficult to draw conclusions about class 04 because of its split grade composition.) Note, however, that the other two classes are characterized by extremely high overlap caused by the placement of low aptitude children in middle and high groups. We suspect that whatever the reason for this overlap, it leads to groups that are difficult to instruct, and that the high rate of change represents the efforts of the teacher to form groups that are easier to deal with.

As table 4.7 shows, about equal proportions of children move to higher and to lower groups. However, classes differ in the relative proportion of upward versus downward movement. Four classes contain large proportions of children moving upward: 01, 03, 09, and 11. None of these was distinguished by many low aptitude children. This tendency will be explored later when we discuss group changes.

TABLE 4.7
PERCENTAGE OF CHILDREN IN EACH CLASS REMAINING IN THE SAME INSTRUCTIONAL GROUP AND CHANGING GROUPS

			Change	
School	Class	No Change	Upward	Downward
A	01	75.68	24.32	0.00
B	02	77.15	14.28	8.57
	03	66.67	22.22	11.11
	04	33.33	16.67	50.00
	05	88.57	11.43	0.00
D	09	74.07	25.93	0.00
	10	77.78	11.11	11.11
E	11	42.85	42.85	14.30
	12	65.52	10.34	24.14
F	13	86.49	0.00	0.00
		13.51[a]	0.00[a]	0.00[a]
	14	36.36	0.00	36.36
		6.06[a]	0.00[a]	21.21[a]
	15	88.89	0.00	11.11
Total		70.51	14.36	15.13

Note: Data in this table exclude school C. [a] These figures indicate children who change classes.

To determine what considerations teachers keep in mind when making such changes, we are concerned with two characteristics of children who changed groups: aptitude and learning. Do teachers take aptitude into account as the basis for changing a child's group, or do they consider how much the child has learned? Of the children who moved upward from their original group, 55.4 percent were above their group's mean in aptitude; of the children who moved downward, 57.6 percent were below their group's mean in aptitude. In short, there is a rather weak relation between relative aptitude score and the likelihood of children transferring between groups.

Although aptitude might serve as the basis for transfer out of initial fall groups, we expected that the actual learning of material would provide a better explanation of the children who transferred upward. Seventy-five percent were above the mean of their fall group in the number of words learned by December; and of those who moved downward, 73.9 percent were below the mean of their fall group in the number of words learned. Again, learning appears to account for upward and downward transfers considerably better than aptitude.

Our findings indicate that learning in all likelihood represents a substantial and justifiable basis for teachers transferring children from group to group. They also suggest, contrary to the statements of critics, that grouping does not necessarily represent the assignment of children to social categories from which they can never extricate themselves. We

are in no position to say that no children are inappropriately assigned or that there are no cases of children languishing in low groups for improper reasons. But there is reason to believe that teachers respond to how well children do in deciding to transfer them upward and downward, and it is not unlikely that those above their group mean in learning who do not transfer may not have made enough progress to justify a move. Moreover, the fact that learning rather than aptitude is more strongly related to transferring suggests that teachers monitor learning progress fairly closely and do not simply fixate on a presumed indication of capacity that led to the assignment of children to groups in the first place.

Changes in Group Characteristics

The most conspicuous difference between fall and spring classes is that in some the number of instructional groups remained the same while in others a group has been added. In no class does the number of groups decline. Classes with one group in the early fall use two groups starting in the late fall or early winter. Those with two groups in the fall use either two or three in the spring, and those with three in the fall employ either three or four in the spring.

In all classes, teachers redistribute children from one group to another after the beginning of the year. Some send them to higher or lower existing groups; others shift members out of existing groups to establish new spring groups. By virtue of these individual transfers and changes in group number, teachers appear to respond to changes in individual learning, to difficulties in the instructional management of certain kinds of groups, or to both.

Traditional grouping change. The nine classes starting the year with traditional ability grouping are distinguishable into two kinds: those with very large numbers of low aptitude children (02, 05, and 10) and those with much smaller numbers (01, 03, 04, 09, 11, and 12), as shown in table 4.8.

As we now know, teachers with large numbers of low aptitude children create large low groups, which almost necessarily entail classes with equal sized groups. Whether teachers create equal sized groups as a matter of preference is moot when the number of low aptitude children is large. The composition of their classes constrains them to accommodate these low aptitude children whether they prefer to or not, and creating a large low group is a reasonable way to do so. By the spring, as table 4.8 shows, classes 02 and 10 have undergone an organizational change: both have added a new low-middle group that draws from both the low and average fall groups. The reason they do so is most likely because smaller groups provide teachers with greater opportunities for more intensive instruction, closer supervision, and greater support of

TABLE 4.8
GROUP SIZES IN CLASSES IN SCHOOLS A, B, D, AND E, FALL AND SPRING

School	Class	Class Size	Number Low Aptitude Children	Group Size (Fall) Low	—	Avg	—	High	Group Size (Spring) Low	—	Avg	—	High
A	01	37	11	9	—	13	—	15	9	—	4	—	24
B	02	35	19	11	—	13	—	11	5	8	11	—	11
	03	36	8	4	—	14	—	18	4	—	8	10	14
	04	30	10	—	—	5	—	10	—	—	10	—	5
	05	35	22	13	—	13	—	9	13	—	9	—	13
D	09	27	9	2	—	11	—	14	2	—	4	—	21
	10	27	17	10	—	7	—	10	7	7	3	—	10
E	11	28	4	4	—	16	—	8	4	—	8	8	8
	12	29	6	16	—	—	—	13	13	—	10	—	6

the children's work. The teacher in class 05 does not form an additional group; she retains the original three, including the large one of low aptitude. She does, however, change the composition of the middle and high groups by shifting children from the former to the latter, a pattern of change that we will encounter again.

The remaining six classes have small numbers of low aptitude children, and among them, five (01, 03, 04, 09, and 11) have small low groups. For reasons not altogether clear, class 12 has a large low group. Among these five classes (exclusive of class 12), classes 01 and 09 change from fall to spring by moving large numbers of children from the middle to the high group. This pattern suggests that the teachers do not feel terribly burdened by the demands of the low group and as a result can devote energy and time toward moving the higher aptitude children along. Or perhaps this pattern indicates a preferential commitment to the higher aptitude children or alternatively that the teachers' talents are better suited to instructing more able children. We do not know for sure. Note that a similar but less pronounced pattern holds for the teacher in class 05, which has a large low group.

While the teachers of classes 01 and 09 create large high aptitude groups in the spring, those in classes 03 and 11 create new average-high groups (see table 4.8). What distinguishes these four classes is the preoccupation of teachers with the upper end of the aptitude range. They appear to design alternative instructional group arrangements for the more able children when the lower end of the aptitude range does not create massive difficulties in management and instruction. Class 05 may fit this pattern despite its large low group if the teacher is very competent or if she has written the low group off.

These findings show how the nature of grouping established at the beginning of the year influences the pattern of group change later on. Of the three classes that started with large low aptitude groups, two added a new low-average group that reduced the size of the original low group. By contrast, classes that started the year with small low groups underwent changes among the higher aptitude groups. Two classes added new high-average groups, and two others retained the same number of groups but considerably expanded the size of the fall high group. Large initial low groups (or the class properties leading to them such as a large number of low aptitude children) seem to create later teacher preoccupations with the low aptitude end of the class while small initial low groups (or their related class properties) create later preoccupations with the high aptitude end.

Of the nine classes, two remain unaccounted for: 04 and 12. As indicated earlier, class 04 is a special case of a mixed first and second grade class with only the first graders included in our sample. The teacher's grouping pattern in both fall and spring is difficult to make sense of

because we have only a partial sample of the class. Class 12 is unusual in that the teacher established only two groups in the fall: high and low. Although it contains few low aptitude children, the teacher nevertheless created a large low group. Why she did not use three groups in the fall (like her colleague in class 11) remains unclear. Establishing a middle group in the spring represents, perhaps, a reversion to what she might have done initially in the fall.

The grouping configurational indices of the nine classes for fall and spring are contained in table 4.5. Comparing the size inequality indices for the two time periods shows that they remain similar in some classes, but change in others. Our prior discussion helps us to understand these varying indices. Classes in which a substantial number of children were moved upward to a high group (classes 01 and 09) show a marked increase in inequality of group size. Those classes in which a new high-average group was formed (classes 03 and 11) display a decrease in size inequality because equalization in size among the higher groups occurred and the three high groups became more similar in size to the smaller low group. Finally, classes forming a new low-average group (classes 02 and 10) were characterized by a slight increase in size inequality because at least one of the newly constituted groups was smaller than the other groups.

Table 4.9 shows correlation coefficients for the relations between fall and spring configurational properties. As anticipated, given the varied patterns of group reformation during the school year, the coefficient for the relation between fall and spring size inequality is relatively low and not significant.

By contrast, substantial relations exist between the fall and spring indices of the other configurational properties, with the number of groups and the range of group means achieving statistical significance. This indicates that the initial properties of the grouping configuration, with the exclusion of relative group size, tend to mark the character of the grouping arrangement for the entire school year. Teachers who form more groups in the fall continue with the same number or form still more during the remainder of the year; and reciprocally, those who begin with few groups continue to have fewer than the other teachers.

Similarly, teachers who begin with highly discrete groups tend to continue with discrete groups, most likely because the composition of the groups remains the same. Further, as the table shows, those teachers who begin the school year with widely differing groups as indicated by the range of group means tend to increase the discreteness of their groups over the remainder of the year. Perhaps children who are inappropriately assigned to groups, such as low aptitude children assigned to high groups, become more conspicuous when groups and

TABLE 4.9
CORRELATION COEFFICIENTS BETWEEN THE CONFIGURATIONAL PROPERTIES OF TRADITIONALLY GROUPED CLASSES, FALL AND SPRING (n = 9)

	Spring Configurational Properties			
Fall Configurational Properties	Number of Groups	Size Inequality	Discreteness	Range of Group Means
Number of Groups	0.67*	0.00	0.09	0.10
Size Inequality	−0.20	0.33	−0.37	−0.29
Discreteness	−0.08	0.18	0.47	0.44
Range of Group Means	0.13	0.01	0.82**	0.80**

* $p < 0.05$. ** $p < 0.01$.

their instruction differ widely, and this leads the teachers to form more homogeneous groups that differ more in mean aptitude.

Finally, the range of group means shows marked stability. This feature of the grouping configuration reflects the diversity of the class, which does not change over the year, and the degree of group discreteness, which is also stable.

Grade-wide grouping change. School F presents a variation of traditional grouping that combines elements of grade-wide grouping into classes and ability grouping within them. Two classes (13 and 14) contain large contingents of able children combined with very small numbers of low aptitude ones. The third class (15) consists of the middle aptitude range of the grade. The teachers in classes 13 and 14 have small numbers of low aptitude children; not surprisingly, they use small groups. They resemble their counterparts in classes 01 and 09, keeping their small low groups intact while transferring middle and high aptitude children. Children transfer both within and between classes. Class 14 retains its three groups, and class 15, which starts with one class-sized group, divides into two, a smaller low-average and a larger average one. Despite the grouping of classes within the grade in school F, the same sorts of forces appear to govern the rearrangement of groups as do in the more traditional arrangement.

Class 15 presents a situation we will also find in school C: the instability of a single, large, diverse instructional group. That class, with thirty-six members and a very large contingent of low aptitude children, divides into two unequal sized, overlapping, low-average and average groups. What is peculiar about this new arrangement is that the low aptitude children remain in the large group with the exception of a batch that moved to classes 13 and 14. Why should this happen? Most likely, we suggest, it is because the new, small group is composed of the whole contingent that was transferred out of the average group in class 14 in addition to a number split off from the original group in class 15. Social as well as learning considerations may have had a bearing on the for-

mation of this group. It is not clear whether this grade-wide pattern is any better than internal class patterns. It appears susceptible to the same pressures generated by large instructional groups, and low aptitude children are dealt with in much the same way.

Delayed grouping change. The only change occurring in school C is from whole class instruction to a two-group pattern, and it is debatable whether to call this a change or rather the initial formation of groups. Once groups are established, however, their properties remain unchanged and there are no transfers of individuals between them. The case does suggest, however, that very large instructional groups are vulnerable to fission even in the face of teacher preferences for instructing all children similarly. Very large groups do not appear to be viable instructional units because of the wide aptitude variations they contain. This is the same pattern we found in class 15.

Summary

The preeminent point about ability grouping is that it pertains to the way classrooms are arranged *for* instruction; it must not, therefore, be confused with direct instructional influences on individual learning. This means that the conventional research that compares homogeneous and heterogeneous classes for their direct impact on learning falls conceptually wide of the mark because it omits the intervening connection between a class outcome, such as a grouping arrangement, and an individual outcome, such as learning. That connection consists of instructional activities for which the groups were formed in the first place. Instruction and grouping are not the same thing. Instruction takes place *in* groups and, among other things, pertains to the way groups are used.

Grouping is also one of a variety of ways by which individual students are allocated to the various levels of school systems. They are assigned to schools by residential location (and sometimes by race); to grades by age; to high school tracks by interest, family background, aspirations, and anticipations of future life chances; and to classes and groups within them by ability. Because groups differ in size, in number, and in their internal distributions of children's characteristics, we find it difficult to conclude that groups are formed primarily in order to adapt instruction to individual differences. There is a stronger case to be made that teachers create groups in response to how abilities and other characteristics are distributed in classrooms. Grouping does, of course, have implications for the individualization of instruction, but those implications are complex.

If groups are made small to increase opportunities for close and concentrated individual attention, they will also be numerous; and the more groups there are, the more time each child must spend doing relatively unsupervised seatwork outside a small group setting. Essentially, grouping involves trade-offs between different kinds of instructional arrangements, and it is difficult to tell whether instruction is more individualized when a teacher spends thirty minutes working closely with eight children and a basal reader or when children are working by themselves at their own pace, with very little supervision, waiting for their group's turn with the teacher. When we think of the real constraints operating in classrooms, the notion of dealing with individual differences loses much of its conceptual bite.

Whatever the group arrangement used, individual differences do get recognized and dealt with, though not in the way a tutorial arrangement of considerable time duration would deal with them. The critical constraint in classroom grouping is that a teacher must make provision for those children not in the group during the time he or she is instructing the group; and the smaller the group under direct instruction, the larger the remainder that needs to be kept productively occupied without direct teacher attention. Grouping, then, is a solution to the problem of finding a workable way to manage a class so that instruction can be carried out; managing individual differences is then one of the by-products of the solution, but that management always takes place in one kind of collective setting or another.

As noted earlier, we found grouping to be a response to the classroom distribution of children's characteristics. The evidence for this gives credence to the formulation of school production that sees events occurring at one level bearing on what happens at other levels—in this case, the influence of class properties on group characteristics. Inherent in the process of arranging a class for instruction is the creation of groups and by definition their properties. Moreover, the linkage between classes and groups is of a conditional nature and not one that lends itself readily to description in linear terms. This is because some kinds of class distributions tightly constrain the available grouping arrangements while others allow teachers leeway to select alternatives consistent with their preferences or proclivities.

Our evidence indicates, finally, that reading groups can be alterable arrangements. We found no support for the idea that groups represent self-fulfilling prophesies, that children expected before the fact to do poorly are left to languish in low groups while those expected to do well are given opportunities to shoot ahead (Rist 1970). The teachers observed in this study moved children from group to group largely on the basis of how well they did. They also changed the grouping arrangements of classes according to the workability of the initial arrangement. That we did not find evidence of vicious classification and discrimination does not mean that it never occurs. The point to be made, however, is that such events are not inherent in the phenomenon of grouping; any social

arrangement can be used properly or improperly. We found the teachers in this study to be responding to the distribution of aptitudes in their classes by forming different configurations of groups; and in the next chapter, we will show how they design instruction for the groups that make up these configurations.