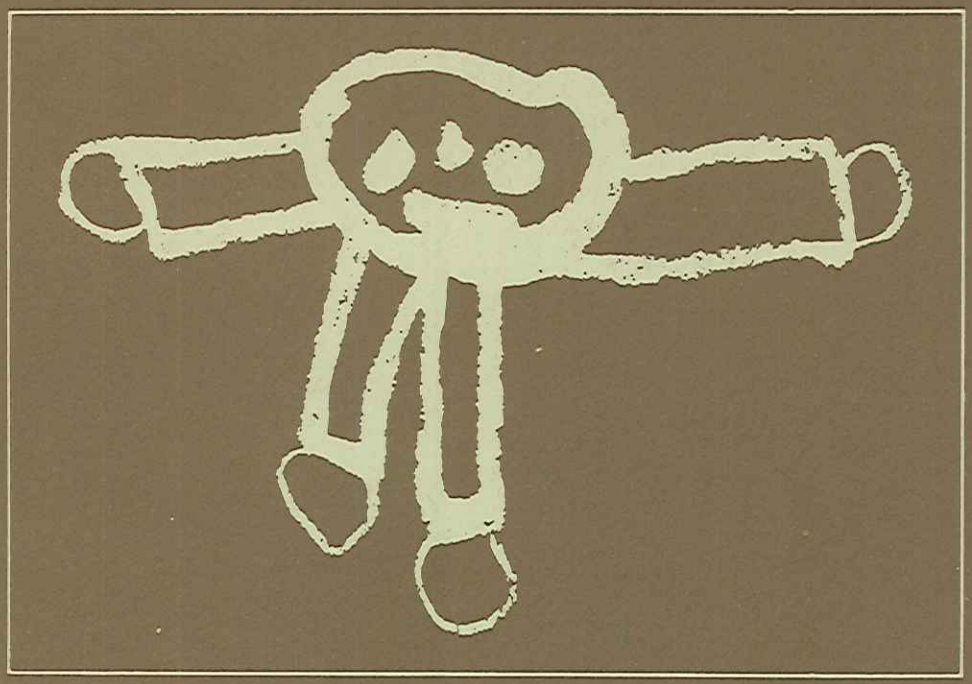
North Dakota Study Group on Evaluation



Sylvia Ross, Herbert Zimiles,
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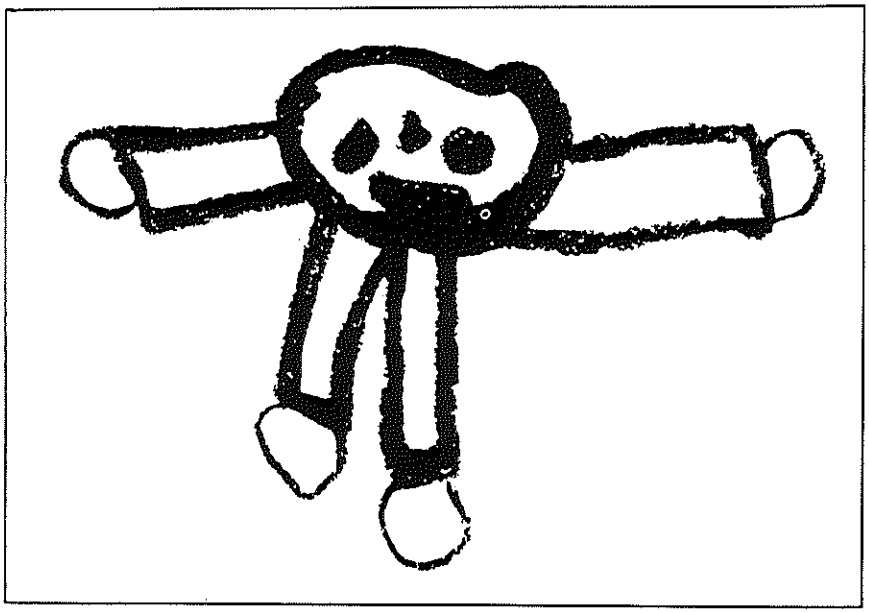

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University of North Dakota
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In November 1972, educators from several parts of the United States met at the University of North Dakota to discuss some common concerns about the narrow accountability ethos that had begun to dominate schools and to share what many believed to be more sensible means of both documenting and assessing children's learning. Subsequent meetings, much sharing of evaluation information, and financial and moral support from the Rockefeller Brothers Fund have all contributed to keeping together what is now called the North Dakota Study Group on Evaluation. A major goal of the Study Group, beyond support for individual participants and programs, is to provide materials for teachers, parents, school administrators and governmental decision-makers (within State Education Agencies and the U.S. Office of Education) that might encourage re-examination of a range of evaluation issues and perspectives about schools and schooling.

Towards this end, the Study Group has initiated a continuing series of monographs, of which this paper is one. Over time, the series will include material on, among other things, children's thinking, children's language, teacher support systems, inservice training, the school's relationship to the larger community. The intent is that these papers be taken not as final statements--a new ideology, but as working papers, written by people who are acting on, not just thinking about, these problems, whose implications need an active and considered response.

Vito Perrone, Dean
Center for Teaching & Learning,
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Introduction

This report deals with the problem of assessing children's classroom interactions; it presents the results of a comparative study of group interaction in contrasting educational environments with children of different socioeconomic backgrounds. Originally issued in 1975, this shorter version is made timely by the fact that an increasing number of federally funded educational projects for young children of low-income families are including programs representing adaptations of various forms of nontraditional education in public school settings.

Many educators and parents have questioned the usefulness of nontraditional approaches in inner-city public schools; that is, in schools whose student bodies are predominantly low-income minority groups. Some reject methods which foster child autonomy because they associate more freedom for the child with lack of discipline and control in the classroom. Others equate all nontraditional, informal approaches with "lack of structure," an insufficent emphasis on academic learning and cognitive development. It has been left to those who seek to improve the education of poor children of diverse ethnic backgrounds to answer fundamental questions regarding the ways in which children's learning experiences differ in traditional settings.

To what extent are the differences in approach reflected in the children's behaviors? Does educational approach influence the kinds of questions children ask, their attitudes toward each other, their willingness to help each other? What is the effect of the more informal spatial arrangements and greater teacher and pupil mobility found in nontraditional classrooms on the *quality* of children's interactions? Does an "open", independence-fostering, child-centered environment that seeks to encourage self-expression, produce a greater incidence of destructive, acting-out behavior than the traditional setting, which has a high degree of control as one of its major practices?

Does the attempt to integrate and balance cognitive, affective, aesthetic, and social learning experiences result in fewer cognitive interactions than are found in traditional settings, where academic learning is the primary objective?

How does the behavior of inner-city children of low-income families in the open classroom differ from their behavior in a traditional setting? How does the behavior of this group differ from that of children of middle-income

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families in either setting.

These have not been easy questions to answer--particularly in a way that suits the funding agencies. The methodology for systematically observing children's classroom interaction has been slow to develop, even though the belief--that child-to-child communication plays a significant role in the child's cognitive and social-emotional development--has long been a premise of progressive education. It goes back to Dewey (1899, 1938) and it has been reiterated more recently by Jean Piaget:

> ...the cooperation among the children themselves has an importance as great as that of adult action. From the intellectual point of view, it is such cooperation that is most apt to encourage real exchange of thought or discussion, which is to say all the forms of behavior capable of developing the critical attitude of mind, objectivity and discursive reflection. From the moral point of view it results in a real exercise of the principles of behavior and not solely in a submission to external constraints (1970, p. 180).

But in conventional research on classroom processes, the primary focus has been on teacher behavior. An educational transaction has been viewed as initiated by the teacher, and its effect defined in terms of its impact on the child, as demonstrated in paper and pencil tests. Thus, evaluation studies typically relate observational studies of teachers to test performance of children. Teacher behavior is the independent variable and children's test behavior the dependent variable. It is an approach that overlooks the complexity of the classroom transaction in which the children's interactions mediate the influence of the teacher.

Another perspective has been taking hold, however, as many recent publications attest.* The observation system used in this study is a case in point. The Differentiated Child Behavior Observation System (DCB)** was originally developed as one of a number of measures designed to record and evaluate the progress of the Bank Street Follow Through Program, a program which involves the application and implementation in inner-city public schools of the educational approach developed and applied over many decades in the laboratory school of the Bank Street College of Education.

*For a full discussion of related literature, see original Bank Street College report.

**Ross, 1971

The Bank Street approach seeks to produce an emotional commitment to learning, to have the child experience meaning in what he or she is learning, and to build upon the child's own experience in organizing and assimilating new knowledge. It is not exclusively concerned with the acquisition of narrowly-defined skills; its educational goals are defined in humanistic developmental-psychological terms. Neither the content nor the method of achievement testing is suitable for evaluating its impact. The DCB,

by contrast--as we explain in more detail in the next section--emphasizes the substantive aspects of children's interactions, and sees these as an important index of the quality of education children are receiving, and as an indicator of their current level of functioning.

This study examines group interaction, as measured by the DCB, in one traditional classroom setting and in two variants of a nontraditional classroom setting. Since these contrasting educational approaches serve as a primary basis of comparison in the analysis of DCB results, they need to be clearly distinguished from one another.

Traditional Education

The traditional approach continues to be the predominant method applied in the public schools of this country despite almost a century of recurrent challenges regarding its effectiveness. Its definition in contemporary writing hardly differs from the formulations of John Dewey (1938):

> The main purpose or objective (of traditional education) is to prepare the young for future responsibilities and for success in life by means of acquisition of the organized bodies of information and prepared forms of skill which comprehend the material of instruction. Since the subject matter as well as standards of proper conduct are handed down from the past, the attitude of the pupils must, upon the whole, be one of docility, receptivity, and obedience. Books, especially textbooks, are the chief representatives of the lore and wisdom of the past, while teachers are the organs through which knowledge and skills are communicated and rules of conduct enforced (p. 3).

Piaget also identifies traditional education in terms of its primary type of social relationship, i.e., the action of the teacher upon the pupil, which he describes as the only real type of relationship possible within the scope of the traditional classroom (1970). Like Dewey, he points to the passive and receptive role of the student, identifying the verbal lesson as the principal mode of adult teaching. The traditional approach has also been defined in terms of its formality, the lack of flexibility shown in relation to the use of space and time, the emphasis on total groups as opposed to individual learning situations, and child assessments which are based on conformity to preconceived general standards and levels of expectations (Minuchin, Biber, Shapiro, and Zimiles, 1969; Spodek, 1972; Weber, 1973; Rathbone, 1972).

Nontraditional Education

Although this term may refer to any approach which differs

in basic aims and methods from those described above, in this study it is applied specifically to two variants which are governed by certain fundamental principles: (1) the approach influenced by John Dewey, which has been variously termed 'progressive', 'experimental', 'modern', and more recently, 'developmental-interaction' (Shapiro and Biber, 1972); and (2) the 'open education' approach, which though relatively new, has been identified as having much in common with the theory and practice of progressive education (Biber, 1972; Spodek, 1972) and as sharing similar roots (Weber, 1973).

The Developmental-Interaction approach has been described as a philosophy of education that has been evolving for about 60 years, influenced by ongoing study in the field of child development with an educational design that "seeks to recognize the worth of individuality, give priority to skillful thinking and problem-solving, highlight learning through direct contact and interaction with the environment, and organize the internal school world as a cooperative social system." Its underlying values are "derived from a humanist position, both as to what constitutes optimal development of the individual and priorities for social organization" (Biber, 1974).

Interaction is seen as fundamental to this approach: child-teacher, child-child, child-environment, as well as the interaction of cognitive and affective developmental processes central to all learning; the development of intellectual functions cannot be separated from the development of personal and interpersonal processes (Shapiro and Biber, 1972).

The goals of this approach are "to enable the children to function effectively and productively: to help them develop into confident, inventive, constructive human beings who see themselves as learners, who feel responsible for their own development, who feel secure in the mastery of needed competencies and who are both free to express their own feelings and sensitive to the feelings of others" (Gilkeson, 1973).

Central to this approach is the social studies program, "an expanding, spiraling study of the life activities of man beginning with the young child's immediate reality" and expanding out in both time and space. It seeks to integrate the cognitive, the affective, and the aesthetic, and is designed to give the child a sense of how man uses his environment, as well as a sense of oneself as a member of one's world or community and an appreciation of others (Biber, 1972).

Open Education programs in this country are a more recent development, influenced by current reforms in British primary schools and the resultant infant school model. This form of education has been described as a way of thinking about children, about learning, and about knowledge, which is characterized by openness. Space is organized according to functional needs and is adaptable; time is

open, and scheduling is adjusted on the basis of individual and group needs. Knowledge is defined as the child's ability to confront and deal with new experiences successfully, rather than to verbalize set responses on demand (Barth, 1975). The child is described as an active agent in his own learning process and the schoolroom a dynamic, adaptable society in which the adult assists rather than directs the child's activity (Rathbone, 1972).

The form of open education represented in this study provides for the development of small learning communities with classrooms of different grade levels grouped around the corridor they share. Basic to this program is not only respect for and recognition of the uniqueness of each individual, but also the development of a sense of community. The use of the corridor results in an extension of the classroom space to accommodate activities which cannot be contained in a classroom and encourages the mingling of children from different classrooms. The communal nature of the corridor is also designed to support teachers in their own development and to foster the exchange of ideas and the sharing of materials and techniques; the voluntarism of participating teachers is an important aspect of the program.

Educational practices stem from the belief that, for each child, learning results "from a process of repeated encounters with firsthand, concrete experiences, from interaction with other people, and from reflection on these experiences and interactions." Classrooms are, therefore, organized so that children can work individually or in small groups and are designed to foster social interaction and access to a rich environment which stimulates and supports the child's curiosity and interest (Weber, 1973).

As experimentation with variants of open education continues, the need to arrive at an acceptable methodology for evaluating such programs will become more acute. One approach to the evaluation of open education is to broaden the scope of assessment of school impact to include problem-solving skills, creativity, and various measure of personality and social behavior. Another, more radical stance, based on the conviction that existing methods of psychological assessment are not adequate for the definitive measurement of the range of cognitive and socio-emotional variables influenced by school experience, advocates that evaluation be redirected to the assessment of the psychological environment a school provides (see Zimiles, 1973). Both of these strikingly different solutions to the problem of evaluating open education call for the development of methods for assessing group interaction in the classroom.

1

The Observation System

The Differentiated Child Behavior (DCB) System* is used 'live' in the classroom, and the data are gathered by trained observers who encode children's interactional behaviors on time and change-of-behavior bases. One of the distinctive features of this system is its emphasis on the substantive aspects of children's interactions; it provides data regarding the content as well as the source and direction of each entry.

RATIONALE

Fundamental to the rationale for the development of this system is the belief that the way the child functions in the classroom is itself a most significant educational outcome, one that has generally been overlooked. The basic assumption underlying this system is that the children's behavior will reflect the attitudes, values, and curriculum emphases of the classroom instructional team.

In developing the DCB instrument, we first sought to describe classroom interaction in terms of its psychological significance. Of particular interest was the identification of such behaviors as causal reasoning and problem-solving that occurred either in giving information or asking questions, expressions of feelings and attitudes, indications of concern for others, willingness to help and share, and such forms of autonomous behavior as initiating tasks, planning cooperative projects, and resolving conflicts. The theoretical significance of these behavioral characteristics had been stated in the writings of researchers and educators long associated with Bank Street, and reaffirmed in conversations directed at identifying salient interactional variables. Extended observation and recording of classroom interactions resulted in modifications and elaborations of the originally formulated set of behaviors. As the comprehensive roster of classroom interaction behaviors evolved, we settled on a basic grouping of six categories. Some of the categories dealt primarily with the cognitive and representational content of interactions, others with affective-expressive features, and still others with managerial aspects of interaction. Although we recognize the artificiality of separate delineations for cognitive, affective, and representational behaviors and, indeed, emphasize their interrelationship and interdependence in describing children's interactions, this categorization was

*The DCB was developed by Sylvia Ross in 1971. Elizabeth Gilkeson, director of the Bank Street Follow Through program, made substantial contributions during its formation. Barbara Biber, Garda Bowman, Margery Franklin, and Patricia Minuchin offered valuable suggestions and critical comments regarding aspects of the observation system, as did Herbert Zimiles, who also acted as consultant in preliminary DCB studies.

Significant contributions were also made by members of the research staff of the 1975 study: David Gerstein, Dinah Heller, Marcia Judson, and Barbara Schwartz, and by the many graduate students at Bank Street College of Education who acted as observers during initial studies of the DCB.

adopted to facilitate a quantitative differentiation, which we felt to be useful.

The continuing process of recording and analysis of children's classroom interactions resulted in the identification of relevant subcategories and served to confirm the viability of the six-category system. In addition to coding the interaction according to categories of content, each recorded interaction was also coded in terms of its source and direction. A second observation form, the Classroom Scan, was added to identify the situational variables and potential learning opportunities in a given classroom setting.

INSTRUMENTS[1]

The observation system includes two instruments: the DCB Form and the Classroom Scan.

DCB Form. The DCB Form has been designed to provide quantitative and qualitative data regarding children's verbal and nonverbal classroom behaviors. The focus in observations of natural groupings of children in ongoing activities, with or without an adult present, is on the number of occurrences of specified behaviors, as well as on the nature of the interaction in each instance, i.e., child-to-child, child-to-adult, to or by self; adult-elicited or child-initiated; individual or choral response. The referent child's sex is also indicated in each instance.[2]

The six major behavioral categories of the DCB are:

I. Gives Information
II. Asks Questions
III. Expresses
IV. Behaves Destructively
V. Organizes and Manages
VI. Represents and Symbolizes

In addition, each of these six categories includes from six to 10 subcategories which are designed to identify specific behaviors within each general category.

The first two categories, *Gives Information* and *Asks Questions*, are primarily concerned with verbal behaviors in the cognitive domain.[3] The subcategories subsumed under these headings have to some extent been ordered according to the increasing complexity of their content:[4]

Category I: Gives Information (Cognitive Domain).
Subcategory 1: Identity-Situation includes factual information regarding personal events ("I got a puppy for my birthday"), rote responses, and labeling without further descriptive or differentiating details.
Subcategory 2: Prediction, Plan includes the child's guess or hunch ("I'll bet there's a frog in that jar") and projections of future plans ("Tomorrow I'm bring-

1. The Observer's Manual of Instructions includes sample forms and a complete set of definitions and instructions (Appendix A).

2. See schematic representation on p. 12.

3. This presentation is limited to the most salient points of definition. For a more comprehensive listing of examples for each subcategory component, see the Observer's Manual, Appendix A, "Definitions and Examples," in the original Bank Street College report, (June 1975).

4. In both Categories I and II, Subcategories 2 through 7 are regarded as dealing with 'higher-level' cognitive behavior, whereas Subcategory 1 in both Categories I and II deal with routine transactions. The distinction between Subcategory 1 behavior in Categories I and II and the remaining subcategories has been regarded to be sufficiently important to preserve throughout the basic statistical analysis (see the Results section).

ing all the stones I collected and I'm going to start labeling them for our science table").

Subcategory 3: Function, Process, Instructions includes information regarding what things are used for ("The thermometer is to see how hot the water is"), how things work ("When you strike the key it pushes the lever"), and how to carry out a task or play a game ("This double checker can move either way").

Subcategory 4: Differentiating Properties covers a wide range of descriptive statements regarding sensory qualities such as color and texture and defining characteristics, e.g., size, form or quantity ("There are 10 fish in the tank").

Subcategory 5: Relationships deals with comparisons ("It's the same color as the moss"), as well as with temporal, spatial or ordinal relations.

Subcategory 6: Category, Class includes behaviors in which group membership is identified ("Mold is a kind of plant").

Subcategory 7: Causal Reasoning, Problem-Solving includes an attempt to explain why things happen the way they do ("It's heavier than water, that's why it sinks"), and a solution to an identified problem ("What we need are some railings so the cars won't go off").

Category II: Asks Questions (Cognitive Domain). The subcategories in Category II are the interrogative parallels of those described above for Category I. For example, if the child points to an object asking "What's that?" it would be entered in Category II, Subcategory 1, *Identity-Situation;* the question "Which is bigger?" would be entered in Subcategory 5, *Relationships.* Subcategory 7, *Causal Reasoning, Problem-Solving,* includes the child's inquiries regarding the underlying cause of natural phenomena ("What makes the lightning?") or of an observed event ("Why do some things stay on top of the water and not others?").[5]

Category III: Expresses. Includes both verbal and nonverbal behaviors which are primarily affective in content, i.e., expressions of feelings and attitudes (negative as well as positive) and of preferences and needs.

Subcategory 1: Routine Needs refers to behaviors such as pencil sharpening or taking a drink of water.

Subcategory 2: Needs-Social/Physical includes complaints ("Your paper's taking too much room." "My knee hurts where I bumped it") and requests ("Move over so I can see").

Subcategory 3: Needs-Tasks Related includes general requests for assistance ("Can you help me?"), materials or equipment ("We need stuff for a collage") and requests for approval or recognition of one's own work ("Do you like my picture?").

Subcategory 4: Preferences and Desires includes responses given within the context of explicit choice, as well as more general expressions of individual preferences ("I hope we have tuna for lunch).

5. It should be noted that questions dealing with expressions of need, feelings, interest in other's opinions or feelings are entered not in Category II (Cognitive Domain) but in Category III as indicated below. Similarly, questions occurring within framework of role playing in Dramatic Play Episode would be entered in Category VI.

Subcategory 5: Feelings, Attitudes, Opinions includes negative as well as positive expressions ("I hate cleaning up") and beliefs ("Girls are smarter than boys").
Subcategory 6: Interest in Another's Attitudes or Opinions includes questions such as "What's your favorite program?" and "Do you like to go to gym?"
Subcategory 7: Affection, Warmth, Humor includes nonverbal behaviors (Child strokes rabbit gently), as well as verbal statements indicating a positive relationship with another ("We're best friends, right?"), good-natured joint laughter, and sharing 'joke' with pleasure evidenced by all concerned.
Subcategory 8: Concern for Others includes nonverbal behaviors showing willingness to help or share as well as verbal statements or questions indicating support of another's efforts, or consideration for another's feelings and well-being ("You can have some of mine").
Subcategory 9: Unwillingness to Help or Share includes negative responses to requests for help ("Go get it yourself") or for sharing belongings, materials or equipment ("Don't give them any, they're just for us").

Category IV: Behaves Destructively. Defined to refer to behaviors in which there is physical abuse, threat of physical abuse, or verbal abuse.
Subcategory 1: Verbal-Initiates includes threats of physical abuse as well as extreme taunting, derisive behavior ("You're the stupidest one in the class; you never know any of the answers--dumb dumb").
Subcategory 2: Verbal Defense refers to retaliatory threats ("If you do that, I'll punch you right back").
Subcategory 3: Physical-Initates is limited to those overt behaviors that appear intended to cause injury.
Subcategory 4: Physical Defense, as above, is limited to retaliatory behaviors that appear intended to cause injury.
Subcategory 5: Takes Other's Belongings
Subcategory 6: Destroys Another's Work
Subcategory 7: Abuses Material and Equipment
Subcategory 8: Challenges Established Classroom Rules includes negative responses by child to reminders regarding established classroom limits and expectations.

Category V: Organizes and Manages. Represents the attempt to assess the extent of child autonomy evidenced in the classroom. (Note: Coding system identifies child-initiated as opposed to adult-elicited behaviors.)
Subcategory 1: Records Choice of Task (on bulletin or blackboard).
Subcategory 2: Suggests Task or Activity ("Let's play with the blocks").
Subcategory 3: Initiates Task (Child goes to easel and starts painting).

Subcategory 4: Commands, Directs refers to managerial rather than instructional behaviors ("Get the blocks").

Subcategory 5: Initiates Attention Focus refers to situation where the child enthusiastically calls attention to an event or feature which he believes to be of general interest ("Hey look at the plant, there's another green thing coming out").

Subcategory 6: Seeks Answers requires some evidence that a question has been raised and a possible resource identified ("Let's look at the chart--it tells you how much you need").

Subcategory 7: Selects Materials refers to the selection of materials and equipment from cabinet or shelf where they are stored.

Subcategory 8: Replaces Materials, the child returns materials and equipment as above.

Subcategory 9: Straightens Up Work Area includes behaviors such as mopping up spills or picking up puzzle pieces that have fallen onto the floor.

Subcategory 10: Attempts to Resolve Conflict refers to attempt by child to reduce conflict by clarifying situation ("We didn't mean to knock it over; it was an accident") or an attempt to settle dispute by compromise ("Since they won't let us make it longer over there, we'll make it longer over here").

Category VI: Represents and Symbolizes. Focuses on the child's aesthetic and imaginative expressions, as well as symbolic interactions.[6]

Subcategory 1: Structures Dramatic Episode includes behaviors relating to dramatic play in which the child may assign roles and give directions ("Let's pretend this is the bus and I'll be the driver").

Subcategory 2: Elaborates Dramatic Episode includes role-playing and use of objects to represent other things.

Subcategory 3: Makes Descriptive Comparisons includes the use of figures of speech or idiosyncratic modes of description ("I feel cold like a butterfly"--statement by a shivering child).

Subcategory 4: Improvises Sound refers to play with syllables, initial consonants, words, or tapped out rhythms, etc.

Subcategory 5: Makes Up Story, Song, Poem includes child's creative expressions whether in the form of story, song, poem or dance.

Subcategory 6: Tells Familiar Story may also include the sharing of a riddle or familiar song, or part of TV show.

Subcategory 7: Narrates Sequence of Events refers to both personal and historical events.

Subcategory 8: Shares Symbolic Experience refers to sharing pleasure in book or picture with emphasis on content.

6. Of the nine subcategories in this general category, Subcategory 9, which represents reading drill, is considered a more routine behavior than is found in the subgrouping of Subcategories 1 through 8.

Subcategory 9: Decodes, Reading Drill is limited to a more routine type of reading aloud to another as part of skill practice with emphasis on decoding practice.

A single DCB Form is used for each five-minute interval of observational recording. A total of 12 DCB Forms constitutes a full day of observation. The observations follow a systematic course which is designed to provide representative samples of the behaviors of all the children in the natural setting of the classroom, as they are observed interacting in groups of various sizes and participating in ongoing activities as they occur with and without adult intervention. Activity, grouping, and adult role are indicated for each DCB Form.

Classroom Scan. The Classroom Scan, which is the second instrument in the DCB system, provides a measure of the behavior of each child in the classroom during each of six time samples during the day (i.e., whether involved in an activity, observing, involved in a social-physical interaction, destructive act, or showing "no observable focus"). It also provides for a description of the number and kinds of ongoing activities and groupings, identifying adult role, if any (i.e., supporting or directing), in relation to each group. The activities are further described as to the perceptual modes involved, degrees of abstraction, and dimensionality of materials. Each scan is administered immediately after a set of two DCB Forms has been completed.

PROCEDURES

DCB Form--Children's Interactions. In selecting the groups to be observed with the DCB Form, the observer seeks to acquire samples of child behavior in the full range of learning situations that typify the classroom activity throughout the observational day. In order to systematize these procedures, guidelines for the selection of activities and groupings to be observed are provided.[7] Four categories of classroom activities have been differentiated: (a) academic: two-dimensional; (b) academic:[8] three-dimensional; (c) other (art, woodwork, etc.); and (d) teacher-led, total and large group lessons or discussions. Whenever more than one activity is going on at once, the observer rotates his observations among activities (a), (b), and (c).[9] In addition, two five-minute observations of teacher-directed large or total group lessons (d) are included, when possible, for each day of observation.

The observer tries to include each of the children in at least one of the five-minute observations.

In observing groups with an adult present, priority is given to groups directed or supported by the head teacher rather than the assistant or paraprofessional. When the en-

7. See original study, Observer's Manual of Instructions, Appendix A, Attachment E.

8. The term "academic" is used in its conventional sense.

9. In some classrooms, where the total group functions as a unit throughout most of the day, there is usually only one activity to observe.

tire class is engaged in the same activity that is not teacher-directed (e.g., math workbooks), the observer records the interactions of groups of four to six children, rotating observing position around the room after each five-minute observation in order to include as many different children as possible. For example, if this one type of activity continues for approximately one hour, there would be four five-minute observations of small group interactions representing four different groups of children working on math workbooks.

DCB Scan. As already indicated, the scan consists of two parts. It first focuses on each of the children in the room, in turn, and then on each of the ongoing activities.

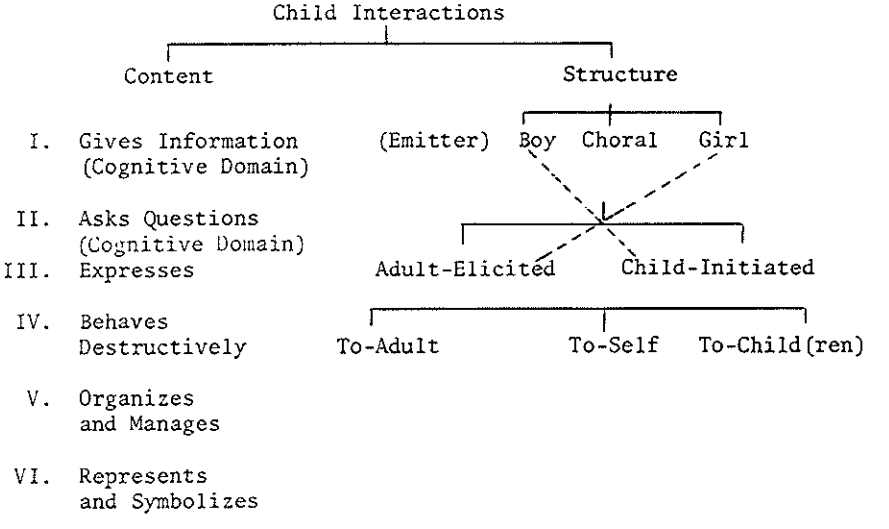
In the first part of the scan, the observer starts with the child nearest the door, observes just long enough to note and record the child's behavior in one of the five categories described above (activity involved, etc.), then proceeds clockwise, observing each child in the classroom in turn.

When the above procedures have been completed, the observer lists each of the activities occurring in the room at that time, entering the additional descriptive material relating to each activity as described previously (adult role, perceptual modes, etc.).

Supplementary Form. The observer also fills out a classroom inventory that describes physical attributes of the room.[10] This is completed during the first half-hour of observation before the class is in session. The procedure not only provides information about the setting, but also serves to acclimate the observer to the room and to the materials and equipment it contains.

10. See original study, Classroom Environment Form in Observer's Manual of Instructions, Appendix A, Attachment B.

DCB CATEGORY AND CODING SYSTEM



2

The Present Study

OBJECTIVES

The DCB was devised within a framework that enables it to record characteristics of interaction in nontraditional as well as traditional classrooms. Its usefulness for documenting the nature of classroom interaction of Bank Street-sponsored Follow Through classrooms was established in previous studies (Ross, 1971, 1972). In this study, we arranged to include a large number of other non-Bank Street forms of nontraditional education in the sample in order to demonstrate the generality of its applicability, provided for further revision and refinement of the DCB Observation System and the preparation of a manual for prospective users, and investigated the psychometric credentials of the DCB:

(a) examined its construct validity by determining the magnitude of its relationship with a series of ratings of teaching behavior based upon observations of teachers;
(b) assessed the reliability of the DCB by determining the degree of agreement among scores obtained on different occasions and from different observers.

The choice of observers, selection of classrooms, and design of the study were governed by the above-mentioned objectives.

METHOD AND PROCEDURE

Observers. Several factors dictated that the data be gathered by more than just one or two observers. Since this study was seen as providing for the last round of revision prior to dissemination of the instrument, it was important to have a pool of observers contribute to it. It was also necessary to have more than one or two observers to provide some sense of the generality of the findings and to establish that the findings of the study were not dependent on the idiosyncratic observations of a particular observer. Included among the group of four observers were individuals of varying amounts and kinds of professional training and experience who varied, also, in their amount of prior experience with the DCB instrument. Prior to the beginning of the actual data collection, the degree of inter-scorer

agreement among observers was assessed by comparing their scores with those of the instrument developer on 109 items. The degree of agreement among observers exceeded 95 percent.

Sample. The classrooms that were observed in this study were drawn from both public and independent schools representing one form of traditional and two forms of nontraditional education. They included children from middle-income as well as lower-income families. The classrooms that were selected fell into one of four groups. The groups were defined in terms of whether the primary mode was traditional or nontraditional, and in terms of economic background of the children's families: (1) Developmental Middle (Nontraditional); (2) Open Lower (Nontraditional); (3) Traditional Middle; and (4) Traditional Lower (see Summary Table below).

Summary Table of Study Sample

Educational Orientation	# of Schools	Type of School	# of Classrooms	Economic Background of Children	Teacher Experience
Developmental/ Interaction	2	Independent	2	Middle	10 years+
Open Education	3	Public	9	Lower	various
Traditional	1	Public	2	Middle	10 years+
Traditional	2	Public	4	Lower	10 years+/ 5 years

The two Developmental Middle classrooms were selected from two independent schools attended mostly by white children of middle-income families. Both schools adhered to a form of progressive education recently described as the Developmental-Interaction Approach (Shapiro and Biber, 1972). The teachers in both classrooms had more than 10 years of teaching experience.

The primary component of the sample was the group termed Open Lower. These consisted of nine classrooms in inner-city public schools whose teachers were committed to an adaptation of the approach followed in the British infant school model of education and were, at the time of the study, participating in a university-based inservice program in open education.[11] Two distinct features of this program should be noted: (1) participation was voluntary, and (2) advisors sought to support the teacher's individual development in the change process rather than impose externally selected, prescribed methods. The children in these classes were predominantly from low-income families and were largely black and Hispanic. The nine teachers

11. Ten such classrooms were originally selected, but illness and subsequent leave of absence on the part of one of the teachers reduced this sample by one.

varied widely in their amount of teaching experience.

The two Traditional Middle classrooms were in a public school located in a high-income area. The children were predominantly white and of middle-income families. Both teachers had more than 10 years of teaching experience.

The four Traditional Lower classrooms were in two public schools in low-income areas. The children were predominantly black and Hispanic and were from low-income families. One of the four teachers had more than 10 years of teaching experience, the remaining three each had less than five years of experience.

Teachers in the Developmental Middle, Traditional Middle, and Traditional Lower groups were selected by their school principals and directors as both representative of the general educational approach of the designated group and willing to participate in the study. Each teacher was observed prior to participation in the study to validate the principal's designation. The selection of teachers in the Open Lower group was determined by two factors: (1) We wanted to include teachers who were new to the open education program, as well as those who had participated in it for at least one year; and (2) only those teachers who were not involved in other ongoing research studies connected with the program were included. All the teachers in the study were women, except one in the Open Lower group.

Data Collection. The DCB was administered three times to each of the 17 classrooms.* Two of the three administrations took place on one day, and the third on a second day. All the observations took place during the spring.[12] If the first administration was conducted by Observer A, the second observation, which followed after the first by two to 14 days, was also conducted by Observer A, together with another observer--Observer B. Thus, the second day of observations involved simultaneous observations by two observers, one of whom had observed the classroom previously. The simultaneous observations were conducted in order to assess reliability. For all other purposes, data obtained from only two of the three DCB administrations were used in the analysis--those obtained from Observer A on Day 1 and from Observer B on Day 2. Thus the DCB data reported in this study were derived from two days of observation by two different observers in each of the 17 classrooms. The four observers were distributed approximately equally among the four groups of classrooms.

At the conclusion of the DCB data gathering, we arranged to conduct a series of teacher observations in 12 of the classrooms in order to obtain a differentiated assessment of teaching behavior that could be stuided in relation to the classroom interaction data obtained by the DCB. (The details of this phase of the study are presented in the section on Construct Validity.)

12. The original plan of the study also called for the gathering of observation data at differing points in time in order to assess changes in the quality of classroom interaction that take place during the course of the school year. Accordingly, data were gathered in the early fall, and again during the spring. However, because of additional revision of the observation system that took place during the interval between these two periods of data collection, the data were not comparable as originally planned.

*See the original Bank Street Report (June 1975) for a detailed presentation of DCB administration procedures.

DESCRIPTION OF CLASSROOM SETTINGS

Developmental Middle Classrooms. The rooms were divided into five or six major work areas including a large reading section with a rug, comfortable seats, and a rocker. Seating arrangements were flexible and children moved from area to area as tasks required. The children generally worked in small groups with different types of activities occurring simultaneously. In one of the classrooms the work period included such diverse activities as woodworking, cooking, drawing of specimens under a microscope, block-building, puppet-making, reading, math, and sculpture. In the other classroom, science, woodwork and block-building activities took place in other parts of the building with the activities within the room somewhat less varied.[13] Both rooms were described[14] as very active with noise level judged appropriate for the ongoing activities.

A variety of materials and equipment, including teacher and child-made learning materials, was accessible and in use throughout the day. One room contained an abundant supply of natural specimens, as well as a variety of living creatures. Displays of children's work included colorful hand-loomed weavings, charts, graphs, reference materials, books, and art work.

In the other classroom, a large-scale replica of a Dutch Colonial one-room house, built and decorated by the children, occupied one corner area of the room, serving as a self-contained work area for small group activities. Children's projects, which were displayed in all parts of the room, included an illustrated time line, "Manhattan as It Used to Be," charts and graphs, ideas for inventions (illustrated), and a large contour map of Manhattan Island.

Scheduling of activities during classroom work periods was flexible, with children encouraged to choose from among a number of possible activities. They moved from one activity to the next at an individual pace. Each child, however, was responsible for the completion of specific, individually-assigned tasks in the various subject areas.

Total group activities were limited for the most part to teacher-led meetings or discussions, which usually took place twice during the day. At other times, the teacher worked with a small group or an individual child, moving around the room as needed. In one of the classes, the teacher was regularly supported by an assistant and a student teacher, in the other, once a week by a student teacher.

Open Lower. The nine classrooms, all of them located in public schools, were generally divided into four or five work areas with a block-building area and listening center in some rooms, and reading, math, art, and science areas in most. The reading area usually included a rug and provision for comfortable, informal seating. In some of the classrooms, the corridor was used for additional working space. Seating arrangements were flexible and

13. Additional work areas were utilized in the hall outside one of the classrooms.

14. See the original report, the Classroom Environment Form, Appendix A, Attachment B, which was filled out by each observer during the first visit to a classroom.

children moved freely from area to area in most of the classrooms.

Although more than one activity was scheduled simultaneously in each of these classrooms, their number and variety differed from class to class. In most classrooms, the schedule provided for a choice of contrasting activities throughout the day, e.g., science experiments, math games, writing, reading workbooks, dramatic play, construction, and easel painting. In others, the range was considerably more limited. Classrooms also differed as to the materials and equipment available, with some classrooms offering a far greater variety than others, including live animals, cooking facilities, blocks, science equipment, and large tri-wall construction units, and teacher- and child-made learning materials. In most classrooms, the materials and equipment were directly accessible to the children and a large proportion of available materials was used during the observational period.

All children were expected to participate in certain activities each day, e.g., reading and math. Scheduling of activities was generally flexible and children were usually able to rotate among the ongoing activities as determined by their interests and needs. Children worked primarily in small groups, with teachers moving from group to group.[15] A few teachers, however, tended to remain at their desks working with individual children in turn. Most of the classrooms were described as active with a noise level appropriate for the ongoing activities. A number of classrooms were designated as having an excessively high noise level at times.

15. Some of the teachers were assisted by part-time student teachers.

Displays varied from room to room. Some contained colorful murals and jointly constructed projects made by children. Charts and graphs made by teachers and children were in evidence in most of the rooms, as were children's art work and writing.

Total group activities directed by the teacher occurred at least once a day in all but one classroom. These took various forms in the different classrooms, ranging from discussions and meetings to story-reading sessions and, less frequently, formal lessons.

Traditional Middle. Classrooms were large and bright with children's art and written work attractively mounted. Commercial posters, calendars, and teacher-made posters were also displayed as were maps and teacher-made charts, including an outline guide for book reports, letters of the alphabet, and a list of 'adult' words. One class which had been studying a Gilbert and Sullivan operetta had a colorful wall display of children's paintings of the characters. Books written and illustrated by children were also in evidence.

The rooms were extremely quiet and highly controlled. The children sat in assigned seats which were fixed in the same position throughout the day in which they remained for the various activities. The schedule generally involved

the total group as a unit with the teacher either directing the class from the front of the room or sitting at her desk as the children worked individually at tasks assigned the entire group. Movement in the room was restricted, both by virtue of the physical arrangements and by classroom rules.

Few materials other than books were used during the two days of observation, although a number of different kinds of materials were accessible on shelves. In one class, manipulative materials, i.e., cubes, rods, and small blocks were made available during the last period of the day as a 'special treat'. The major part of the day's schedule was devoted to teacher-directed lessons and drills in academic subjects. In one of the rooms, two children at a time were permitted to paint at easels during part of the work period.

Traditional Lower. Although the classrooms were large, space seemed limited with the children's desks and chairs occupying the major area in the room and little fredom of movement possible. Seating arrangements were fixed, with children working at assigned desks for most of the day. Wall displays included children's art and written work and, in some classes, photographs of the children and their families. In addition, there were commercial posters, calendars, and teacher-made charts indicating the months of the year, seasons, honor roll, timestable, alphabet, vowels, and shapes.

Classes generally functioned as total units, either participating in class lessons directed by the teacher, or with children working individually at tasks assigned to the total group. During the reading period, several groups were formed with some children working with the teacher and some with the paraprofessional.

The noise level was extremely variable from room to room. Two classrooms were described as 'hushed' and extremely quiet, one class as having a noise level that was inappropriately high, and one described as variable.

Of the limited number of materials and equipment both visible and physically accessible to the children, those actually used during the observational period were, for the most part, limited to workbooks and readers, with a listening center also available and used in one room. Scheduled activities focused on math and language for the major part of the day with children working either on assignments written on the blackboard or at their workbooks. In one classroom, the construction of Easter baskets constituted a deviation from this routine for one day.

In all four groups, classes were sometimes assigned to activities led by specialists located in other rooms in the school building. Since the DCB observations were limited to activities regularly scheduled in the classroom, these will not be reported on.

3

Results and Discussion

Among the most striking results of our study are the huge differences in the total number of interactions found among the groups during the two days of observation (see Figure 1), which indicate that the sheer amount of interaction that takes place in the classroom is closely related to the educational approach of the teacher. Nontraditional classrooms showed significantly greater total numbers of interactions than did traditional classrooms (see Table 1). Of the two nontraditional groups, the Developmental Middle classrooms had by far the greater frequency of interactions. Children in this group interacted with each other and with their teachers *three* times as much as did children in the traditional groups. Children in the other nontraditional group (Open Lower) totalled *twice* those of the children in the traditional groups. These findings are supported by those of previous studies (Ross-Zimiles, 1974; Innes, 1973), which show that more open, informal settings produce far more interactions than traditional settings.

It is interesting to note, too, that the extreme scores, i.e. the highest and lowest, occurred in the two groups with comparable middle-income, white populations, the Developmental Middle and the Traditional Middle groups.

CATEGORY AND SUBCATEGORY FINDINGS

Turning from the amount of interaction, we may ask more questions about the content of these interactions: What were the children talking about? What kind of activities did they engage in? What were they doing? We referred earlier in this report to the fears of many educators who associate nontraditional, more informal approaches with lack of academic learning and cognitive development, and classroom behaviors that are out of control. We need, therefore, to examine the results relating to the content of the children's interactions in each of the four groups. How are the greater number of interactions found in the two nontraditional groups (Developmental Middle and Open Lower) distributed? Are they primarily limited to expressions of feelings and needs as opposed to cognitive behaviors? Do more active, informal classrooms produce more destructive behaviors?

For a more comprehensive report of findings, see original report (Bank Street, 1975).

Category I (Gives Information). The results indicate, first, that the nontraditional groups, which had the

largest number of interactions, also totalled the greatest amount of interactions in the cognitive domain (see Table 1). Both the Developmental Middle and the Open Lower groups had significantly higher scores in Category I (Gives Information-Cognitive Domain) than did the Traditional Middle and Traditional Lower groups. Even more important is the finding that a far greater proportion of these interactions in the nontraditional groups presented 'higher-level' subcategories of behaviors--such as describing or comparing objects, processes, and events; predicting; reasoning; and problem-solving--as opposed to the more routine or rote statements of Subcategory 1.

Category II (Asks Questions). A pattern similar to the findings in Category I was found in relation to Category II (Asks Question-Cognitive Domain) (see table 1). The frequency of questioning behavior was much higher in the Developmental Middle and Open Lower groups than in the traditional groups. These differences were also statistically significant. Moreover, even greater differences were found when only the higher-level questions of subcategories 2 through 7 were tallied. The Open Lower group showed a far greater number of higher-level questions than did the Traditional Middle and Traditional Lower groups, while the Developmental Middle group had the highest score of all four groups, with more than half of all questions asked by this group in higher-level subcategories.

Of particular importance is the finding that the children in the Open Lower classrooms, who were mostly of poor families, asked three times as many higher-level questions as did the children in the Traditional Middle classrooms, who came from predominantly middle-income homes. This finding underscores the effect of educational approach on the quality, as well as the quantity, of questioning behavior.

These findings are even more striking when we consider that the Traditional Middle group asked more higher-level questions than the Traditional Lower group although the Traditional Middle group's overall total of questioning behaviors was lower. This would appear to support the more commonly held notion that socioeconomic background influences such cognitive behavior. Yet our findings also indicate that the effect of educational approach can supersede that of economic background.

In general, the proportion of children's interactions that were questions, while seemingly low, approximate the findings of others who have studied adults as well as children (Parakh, 1965; Dodl, 1966, and Yonemura, 1967). It would appear that questions are asked relatively rarely in typical interactions.

Category III (Expresses). One might expect Category III scores to represent the interaction pattern most associated with nontraditional education. Yet, the Develop-

mental Middle and Open Lower groups did not show a disproportionate frequency of such behaviors. Although the results indicate significantly greater amounts of expressive behaviors in the nontraditional classrooms, the percent of all behaviors that are expressions of needs and feelings did not differ significantly among groups. It would appear, therefore, that opportunities for this type of self-expression are not gained at the expense of other kinds of behavior. The most striking aspect of the findings in this category is that the predominant expressive behaviors in Category III of both traditional groups related to routine physical and social needs (e.g. "He's pushing me"; "I want a drink.") and to routine task-related requests ("Can I sharpen my pencil?"), whereas the expressive behaviors of the two nontraditional groups more typically involved expressions of feelings and attitudes, as well as concern for others and willingness to help or share (Does it hurt where you cut it?" "Here's some more rods you can use.").

Category IV (Behaves Destructively). The results also indicate that the far greater interaction rates found in the two nontraditional groups did not result in a greater incidence of destructive behaviors, which would reflect lack of classroom controls. On the contrary, the smallest proportion of destructive behaviors occurred in the classrooms of the Developmental Middle and Open Lower groups, with the Developmental Middle group showing practically no incidence of destructive behaviors. The Traditional Lower group showed the *greatest number* of Category IV interactions with the two other groups, Open Lower and Traditional Middle, falling midway.

The relatively low incidence of Category IV behaviors, in general, is in part a reflection of the way in which these behaviors are defined by the DCB Observational System. Children's expressions of negative feelings and attitudes are accepted as valid forms of self-expression and are not automatically regarded as forms of acting-out behavior. Only when the expressions appear to be destructive of others, or of objects, are they categorized as Category IV behaviors. The greater proportion of destructive acts found in the traditional classrooms is therefore a result of particular importance. It would appear that classrooms which are more restrictive in relation to interactional behaviors promote a greater proportion of less desirable, destructive acts. This was also found by McKeen (1972), who reports that less disruptive behavior occured in groups with greater peer interaction.

Category V (Organizes and Manages). Results in this category also indicate important differences between the nontraditional and traditional groups. The scores reflect the extent to which the children were actively and productively involved in organizing and managing their own learning environment. The two nontraditional groups, Develop-

mental Middle and Open Lower, engaged in significantly more Category V behaviors than did the two traditional groups. The Developmental Middle group had the highest total of children's organizing and managing behaviors and the Traditional Middle, the least number. The degree to which the Traditional Lower group outscored the Traditional Middle group in Category V behaviors may reflect a greater laxity in the Traditional Lower classroom controls traceable to differences in teacher experience. Children in this group were more apt to leave seats, select needed or desired materials, and give commands to other children, despite the fact that these behaviors were contrary to stipulated classroom limits. Keeping in mind the higher proportion of destructive behaviors also obtained in the Traditional Lower group, its Category V totals would appear, at least partly, to be indicative of lack of teacher control, as well as of the greater degree of adult management and constraint found in the Traditional classrooms. It should also be noted that the scores of the two nontraditional groups, while highest, are probably underestimated. A great many Category V behaviors are most often to be observed during transitions, e.g., *Records Choice of Task, Initiates Task, Selects Material,* etc., when DCB data are not gathered.

Of further interest are the frequencies of Category V subcategories, which differentiate the groups' behaviors. The Developmental Middle group was the only group with any *Resolves Conflicts* (Category V, Subcategory 10) behaviors (e.g. "Why don't you two work on this side, and we'll move over there and then we'll all have enough room without fighting."). It also had a relatively broad distribution of behaviors into Category V subcategories. The entries of the Traditional Middle group were primarily limited to acts of selecting and returning materials; they showed virtually no evidence of more complex and subtle forms of autonomous behaviors. The Traditional Lower group's entries consisted mainly of interactions in which children commanded each other ("Put it down!"). Although this subcategory was also represented in sizable numbers in the Open Lower group's Category V behaviors, it represented a smaller proportion of this group's Category V score.

Category VI (Represents and Symbolizes). Category VI has nine subcategories. Subcategory 9 *(Decodes Reading Drill)* consists of routine and rote behaviors and is considered to be qualitatively different from the other eight subcategories. The analysis of Category VI findings indicated that the results could be more readily interpreted if Subcategory 9 were considered separately. The remaining behaviors (Subcategories 1 through 8) occurred far more often in the nontraditional classrooms, particularly those relating to the fantasy and dramatic play of the child. Differences between the two traditional groups appeared primarily to reflect the greater number of children's re-

sponses to specific adult questions in the Traditional Middle group, regarding the recall of sequences of events, rather than differences in the number of self-initiated, imaginative expressions. Although the two nontraditional groups showed patterns similar to each other, the Developmental Middle classrooms produced a far greater number of interactions relating to dramatic play episodes involving spontaneous and imaginative representational behaviors.

The public school's emphasis on group reading drill as opposed to the more informal and individualized methods followed in the independent school classrooms of the Developmental Middle group is reflected in the findings relating to Subcategory 9. Of the three public school groups, the Open Lower classrooms showed the most balanced pattern; reading drill behavior represented a relatively small proportion of its total Category VI entries. In contrast, virtually all of the two traditional groups' Category VI behaviors involved decoding or other reading drill activities.

Summary of Category Findings. We have looked at the amount and content of the interactions of each of the four groups and have identified substantial and important differences distinguishing the two nontraditional groups from the two traditional groups. The nontraditional groups (Developmental Middle and Open Lower) not only had far greater amounts of interaction, but also showed far less destructive behaviors than the two traditional groups and totalled significantly more higher-level cognitive, as well as other forms of desirable, behaviors.

Of particular importance are the findings relating to the nontraditional group in public school classrooms (Open Lower) which was made up mostly of children of low-income families representing minority groups, as compared with the traditional group in public school classrooms with children predominantly of white, middle-income families (Traditional Middle). The children in the Open Lower group achieved significantly higher interaction scores representing far greater proportions of higher-level, complex, and desirable behaviors than did the children in the Traditional Middle group, who were from far more economically-advantaged homes.

Differences were also revealed within groups, i.e., between the two nontraditional groups, the Developmental Middle and the Open Lower, as well as between the two traditional groups, as already indicated. Results showed that the Developmental Middle group, with classes in private, independent schools long associated with progressive, nontraditional education, and with teachers who were highly experienced in this approach, had the highest interaction rate, showed the greatest proportion of higher level behaviors, and was the only group to evidence substantial amounts of highly valued behaviors which tend to occur less frequently: causal reasoning and problem-solving.

This group also had significantly more interactions involving affection, warmth, and humor.*

Finally, the findings also revealed basic commonalities. The proportion of interactions in the six major categories of the DCB was essentially the same for all groups. The findings indicate that 40 percent of children's interactions involved information-giving, from 6 to 9 percent involved asking questions, and 29 to 31 percent were forms of expression. Destructive behavior accounted for only from .1 to 3 percent of total interaction, and organizing and managing behavior from 3 to 6 percent. The category with greatest variability was *Represents and Symbolizes,* with scores ranging from 15 to 21 percent. It is when the content of these interactions is more closely analyzed that important qualitative differences are seen, as has been shown above.

COMMUNICATION PATTERNS

Besides drawing distinctions about the content of interactions, the DCB also provides information regarding source and direction of each behavior, i.e, *who* said (or did) *what* to *whom*. Further, each interaction was characterized as either elicited by the adult (in the form of a question, request, or command) or initiated by the child.

These findings provide further evidence of group differences, namely that a major difference between the nontraditional and traditional groups lies not in the amount of adult-elicited behaviors (Table 2) but in the number of child-initiated interactions (Table 3). The two nontraditional groups (Developmental Middle and Open Lower) showed significantly more child-initiated interactions than the two traditional groups, whereas differences relating to the amount of adult-elicited behaviors were nonsignificant.

If open, nontraditional classrooms foster greater amounts of self-initiated interactions among children, what is the nature of these transactions? Both nontraditional groups had a far greater frequency and percentage of child-initiated behaviors in Category I *(Gives Information-Cognitive Domain)* than did the traditional groups. It was further shown that, in the nontraditional groups, most of the child-initiated behaviors that involved information-giving entailed higher-level cognitive communication, i.e., a greater incidence of child-initiated behavior was accompanied by a greater incidence of higher-level cognitive statements. Similar results were obtained in relation to Category II *(Asks Questions*-Cognitive Domain*)*.

Another important and somewhat unexpected finding is shown in the relative proportion of different categories of behavior in each of the four groups. It will be noted that, in the two traditional groups, the percentage of Category III *(Expresses)* behaviors was greater than the percentage of Category I *(Gives Information*-Cognitive Do-

*Individual profiles of each of the four groups are presented in the Summary section.

main) behaviors. On the other thand, the two nontraditional groups had a higher percentage of Category I behaviors than of Category III. These differences, although modest, suggest that the spontaneous interactions of children in the more formal and highly controlled classrooms were *less* likely to relate to cognitive content than those of children in more informal and less constrained settings. In addition, as indicated above, the child-initiated expressive interactions (Category III) found in the traditional settings were primarily limited to expressions of more routine needs and complaints.

In examining the content of children's behaviors that were elicited by the adult, we find that in each of the four groups, the greatest amount of adult-elicited behavior occurred in Category I *(Gives Information)*. However, whereas Category I behaviors represented slightly more than half of all adult-elicited scores in the traditional groups, this proportion was considerably greater in the nontraditional group, rising to a peak of 84 percent in the Developmental Middle group. Similarly adult-elicited behaviors in the Developmental Middle group consisted primarily of higher-level cognitive responses (93.4 percent), while, in the two traditional groups, it was found that adults more often produced rote and routine responses (Category I, Subcategory 1, and Category VI, Subcategory 9).

These findings are of particular interest in that they contradict the widely held belief that the special concern for the affective, as well as cognitive, aspects of development of nontraditional approaches results in a neglect of cognitive content. In neither of the two nontraditional groups (Developmental Middle and Open Lower) did the adult elicit a large number of Category III *(Expresses)* behaviors. Yet both of these groups had substantially more expressive behaviors than the two traditional groups. It may seem surprising that a greater proportion of these were not adult-elicited. Since the observations took place late in the academic year, it may be that the adults' attitudes toward expressions of feelings had already been internalized by the children, and that spontaneous expressions of feelings were generally recognized as acceptable and valid. Also, in the nontraditional groups, interchanges in which the adult elicited the child's feelings regarding personal and/or highly charged matters occurred more typically in one-to-one interactions with the child. These interactions were not included in the data gathering process.

To-Adult Behavior. The To-Adult behaviors represent all child interactions directed at the adult, whether spontaneously initiated by the child, or occurring in response to the adult's question or request. The results indicate that the Developmental Middle group had the largest number of behaviors directed at the adult while the Open Lower group had the least number. Differences among groups, however, did not reach statistical significance (see Table 4).

Although the Developmental Middle groups produced the highest number of child-to-adult interactions, this group showed a relatively low frequency of behaviors directly elicited by the adult (see Table 2). This suggests that, more than in other groups, the children in the Developmental Middle group initiated child-to-adult interactions, i.e., *choose* to communicate with the adult.

If all adult-elicited behaviors are subtracted from the total number of To-Adult entries, by group, the remaining To-Adult behaviors reveal the variation among groups in frequency of contacts with the adult that were initiated by the child. Applying this method of calculation to the data, we find that in the Traditional Middle classroom, the children spoke to adults without being spoken to first only about 29 times in two days of observation, whereas, in the Developmental Middle classrooms, such interactions occurred with an average frequency of 140 times a day. Similarly, the Open Lower group registered an average of 70 child-to-adult interactions initiated by the child; Traditional Lower group, an average of 60. These findings are all the more striking because they do not include the numerous instances in which teachers in the Developmental Middle and Open Lower groups worked with individual children. Such interactions were not subject to observational recording in this study.

The results appear to indicate that encouragement of child-to-child interactions and promotion of small, rather than total, groupings do not necessarily lead to less direct contact and involvement with the adult in the classroom. These findings are consonant with those of Minuchin, Biber, Shapiro, and Zimiles (1969). More recently, a study of teacher behavior in the British infant schools also reports on the frequency of child-initiated interactions with the adult (Resnick, 1971).

The fewer adult contacts found in the Open Lower group mark an important difference between the Open Lower and Developmental Middle groups, i.e., between the two non-traditional groups, which, to a great extent, may be due to the fact that many of the teachers in the Open Lower group had considerably less experience with informal techniques and groupings than did the teachers in the Developmental Middle group.

The relatively high frequency of the To-Adult interactions in the Traditional Middle group in comparison with the other two public school groups (Open Lower and Traditional Lower) must be considered within the context of this group's extremely low interactional total, and underscores the dominance of the adult in its classrooms. In this group, 50 percent of all interactions were directed to the adult as compared with 35 percent in the Traditional Lower group and 25 percent and 20 percent in the Developmental Middle and Open Lower groups, respectively.

Analysis of the *content* of To-Adult behaviors also revealed important differences among the groups, and fur-

ther differentiated between the two nontraditional groups, i.e., the Developmental Middle and the Open Lower, although the range of frequencies was relatively small. The Developmental Middle clearly exceeds all other groups in frequency of cognitive behaviors directed at the adult (Category I, *Gives Information*, and Category II, *Asks Questions)*. Furthermore, the entries in this group represented a considerably greater proportion of higher-level cognitive statements and questions.

In looking more closely at the questions children asked of the adult, we find that in the Development Middle group, there were twice as many higher-level questions as in the next ranking group, the Traditional Middle. On the other hand, the children in the Traditional Middle group asked more higher-level questions of the adult than did the children in the Open Lower. While these results represent a very small number of interactions, they indicate a reversal of the rank order of these groups in relation to most behaviors and point to the possible influence of socioeconomic background in these phenomena. At the same time, the Open Lower group showed a greater frequency and percent of higher-level questions directed at the adult than did the Traditional Lower group. Thus, the frequency of higher-level questions addressed to the teacher seems to be affected both by educational approach and the background of the children.

Differences were also shown in the frequency and percent of To-Adult behaviors in Category VI *(Represents and Symbolizes)*. The Developmental Middle and Open Lower groups both had virtually identical frequency scores which were substantially lower than the scores of both traditional groups. These results appear to reflect the considerable greater frequencies of reading drill behaviors (Subcategory 9) found in the Traditional Middle and Traditional Lower groups. The Developmental Middle group showed the lest number of these behaviors, by far, with its Category VI, To-Adult entries primarily representing Subcategories 1 through 8.

It should also be noted that the Traditional Lower group had the highest incidence of destructive behavior directed at the adult (Category IV), whereas the Open Lower and Developmental Middle groups had virtually none.

To-Child. The amount of child-to-child interaction sharply differentiated the two nontraditional groups from the two traditional groups (see Table 5). In both nontraditional groups (Developmental Middle and Open Lower), almost three-quarters of all interactions were directed toward another child. In the Traditional Lower group, the number of To-Child interactions barely exceeded the number of To-Adult interactions, and in the Traditional Middle group, the To-Adult interactions outnumbered those directed at another child.

The classrooms which provided the children with more opportunity to work together and to interact freely were

associated with a far greater rate of constructive interchange, with differences of high magnitude shown (see Table 5). The Developmental Middle and Open Lower groups show significantly higher totals in Categories I, II, III, and V than those of the two traditional groups. The nontraditional groups also totalled more Category VI interactions directed to another child than did the traditional groups, and also showed the fewest occurrences of destructive To-Child behaviors.

In looking more closely at the Content of the above interactions, we find that the Developmental Middle and Open Lower groups also produced substantially more higher-level interactions in Category I *(Gives Information)*, Category II *(Asks Questions)*, and Category VI *(Represents and Symbolizes)*. The more informal grouping in the two nontraditional classrooms, with their far greater number of child-directed activities, did not lead to a loss of control but appeared to provide more opportunity for children to describe, explain, question, and compare aspects of their mutual experiences, and to share feelings, attitudes, and imaginative expressions.

One of the most surprising findings of this study is that the greater amount of child-to-child interaction in the nontraditional settings was characterized by a greater proportion of cognitive, rather than expressive-social, behaviors directed at other children.

To-Self and By-Self Behaviors. These entries represent behaviors such as the comment of a child to self, humming or singing to self, or interactions with materials and objects. Findings indicate that this type of interaction occurred relatively infrequently in all four groups, with differences among groups insignificant (see Table 6). The considerably larger total of By-Self behaviors in Category V *(Organizes and Manages)* found in the Developmental Middle group reflects the greater incidence of autonomous acts in this group. Of particular interest is the relatively greater proportion of To-Self entries in the higher-level subcategories of Category I *(Gives Information)*. The Traditional Lower group had the highest frequency, by far, of these entries.

Whereas this type of communication has been termed 'egocentric' speech by Piaget (1955), who found it to be common up to the age of seven and regarded it to be indicative of an earlier stage of development, Biber (1942) reported many instances of To-Self communication among the seven- and eight-year-old middle class children during times when they were highly involved in an activity. The results of our study tend to suggest that such behavior is evoked by relatively complex activity. The findings point to the need for further study of (1) the relationship between complexity of cognitive process and frequency of verbal behaviors directed toward self at any age, and (2) the extent to which an environment which provides less oppor-

tunity for communication to others results in greater numbers of To-Self verbal behaviors.

Choral Response. The incidence of choral response was low in all groups except the Traditional Middle group, which produced about three times as many of these behaviors as the other groups (see Table 7). Their greater occurrence in this group appears to be associated with the dominant role of the adult in the classroom and with the expectation that children answer in chorus, rather than individually. In addition, this was the only group in which choral responses were recorded in Category IV *(Behaves Destructively),* representing instances of a child taunted by the others for an error.

CLASSROOM SCAN

The findings relating to the Classroom Scan established important differences among groups with respect to the variety and nature of the experience provided in each type of classroom setting. Of particular interest was not the formal curriculum content, e.g., "Social Studies," "Science," "Math," etc., but rather the experiential characteristics of the activity and the nature of the child's participation. The findings revealed such factors as the perceptual modes involved, the locus of control--whether primarily in the adult or the child--the availability of concrete materials and live objects, and the extent to which representational activity was limited to conventional signs and symbols.

Large differences were found in relation to the proportion of activities in academic areas that involved the use of three-dimensional, or concrete materials. For the most part, this type of activity was found only in the two nontraditional groups, but the difference between these two groups in this respect was substantial. While almost one-quarter of the activities in the Developmental Middle group involved three-dimensional or concrete materials, less than 10 percent of activities in the Open Lower group were of this type.

The significance of experiences with concrete materials for the child's cognitive development has been comprehensively researched and documented in Jean Piaget's work (1955). The theoretical bases for providing the child with a rich variety of materials to be used in meaningful activities related to the child's interests and abilities were developed by John Dewey early in this century. Piaget's subsequent findings serve to verify and underscore Dewey's principles.

Such experiences were for the most part unavailable to the children in the traditional classrooms. Their omission was accompanied by a significantly lower incidence of higher-level cognitive interactions than that found in the nontraditional classrooms which provided for this type of experience.

The fact that the Developmental Middle group had the highest percent of activity-involved behaviors and the lowest percent of observing, social/physical, and destructive interactions of all four groups, appears to support the notion that the activities provided in the Developmental Middle classroom were highly motivating and contributed to a higher incidence of task involvement. Further evidence for this effect in nontraditional classrooms is provided by the greater proportion of children who were found to be involved in an activity in the Open Lower group than in the Traditional Lower group.

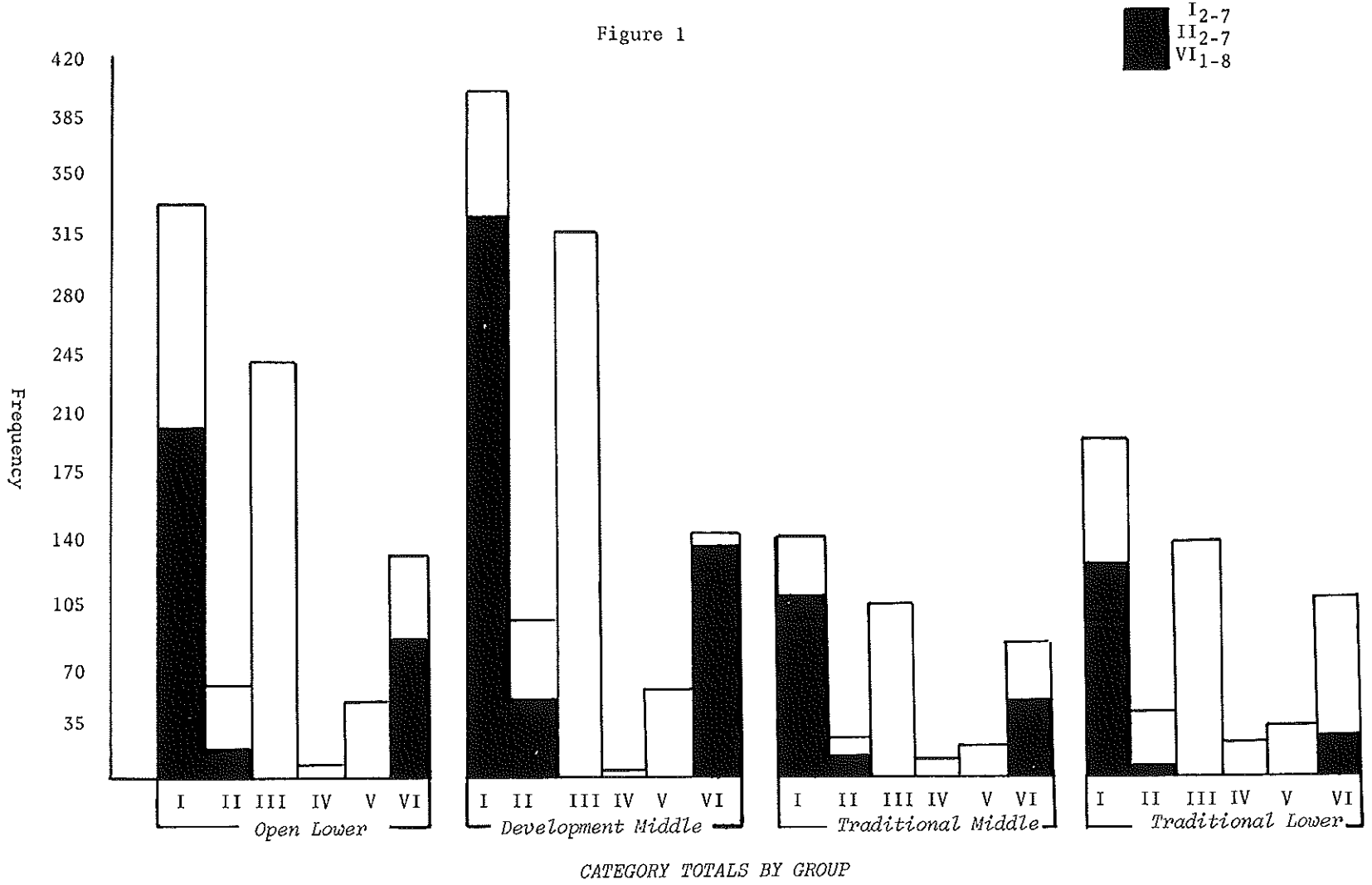
Children in the Developmental Middle group were exposed to a far greater variety of experiences in the classroom. Their classrooms showed a greater exercise of all the perceptual modes--particularly in the use of touch, smell, and taste--greater opportunity for creative expression in the use of free representational modes, and opportunity for creative expression in the use of free representational modes, and opportunity for direct contact with real or live objects. In addition, both the Developmental Middle and Open Lower groups provided for a greater proportion of kinesthetic experiences than did the two Traditional groups in which these experiences were rare.

Of the three public schools, the Open Lower was found to be most similar to the Developmental Middle group, providing for more three-dimensional and tactile experiences and contact with real or live objects than the two Traditional groups.

As to activities involving representation, differences among the four groups in relation to the percent of activities involving conventional signs and symbols did not achieve significance (both traditional groups showed a greater proportion of these activities), while differences in the percent of activities involving free representation were statistically significant.

The Scan results also indicate the ways in which the adult functioned in relation to the ongoing activities. There were fewer adult-directed activities and more adult-supported activities in the two nontraditional groups. In addition, some comparisons between the two nontraditional groups, and between the two traditional groups show that in Developmental Middle classrooms, the adult role was more equally distributed among the three categories (Directing, Supporting, No Adult) than in the Open Lower classrooms. In addition, the adult took a supportive role far more often in the Developmental Middle while the Open Lower group showed a greater proportion of "No Adult" situations. Comparison of the two traditional groups shows the unique position of the Traditional Middle group in its extremely high percent of adult-directed situations. More than three-quarters of all activities were so identified. In the Traditional Lower group, the adults tended either to direct the activity, or not to be involved at all.

Figure 1



CATEGORY TOTALS BY GROUP

Table 1

Mean Total Frequency of Behaviors in Each Category by Group

Categories	Devpmtl Middle	Open Lower	Trad. Middle	Trad. Lower	F	t_1[a]	t_2[b]
I	404.5	328.1	145.0	206.0	5.37*	3.31**	2.47*
II	88.5	62.6	20.5	31.3	14.39**	4.12**	3.99**
III	317.5	248.1	107.0	142.8	17.93**	4.83**	4.69**
IV	1.0	7.7	7.0	15.0	1.52	0.10	1.50
V	54.0	45.1	12.0	22.5	4.52*	2.73**	2.43*
VI	148.0	128.3	78.5	106.3	0.97	1.36	0.78
Total	1013.5	819.9	370.0	523.8	15.35**	4.80**	4.11**

Subcategory Groupings (I, II, VI)

Subcategories	Devpmtl Middle	Open Lower	Trad. Middle	Trad. Lower	F	t_1	t_2
I_1	80.0	104.1	53.0	79.5	3.01+	2.73*	1.72
I_{2-7}	324.5	233.7	92.0	126.5	5.58*	2.42*	2.33*
II_1	43.5	38.7	12.5	26.8	9.79**	4.68**	2.77*
II_{2-7}	45.0	23.9	8.0	4.5	15.82**	2.73**	4.33**
VI_{1-8}	142.5	83.2	36.5	21.0	10.06**	2.12+	3.68**
VI_9	5.5	45.1	42.0	85.3	4.47*	0.15	2.54*

\+ = $p < .10$
* = $p < .05$
** = $p < .01$

a. t_1 refers to mean difference comparisons between Open Lower and Traditional Middle groups.

b. t_2 refers to mean difference comparisons between Open Lower and Traditional Lower groups.

Table 2

Mean Frequency of Adult-Elicited Behaviors in Each Category by Group

Categories

	Devpmtl Middle	Open Lower	Trad. Middle	Trad. Lower	F	t_1	t_2
I	69.0	55.3	90.0	83.3	0.70	1.11	1.11
II	0.5	0.8	1.5	0.3	--	--	--
III	9.0	7.4	20.5	8.3	1.73	2.25*	0.18
IV	0	0	0	0	--	--	--
V	0.5	0.7	2.0	0.3	--	--	--
VI	7.5	18.9	54.5	49.0	4.90*	2.54*	2.79*
Total	86.5	83.1	168.5	141.0	2.35	2.15*	1.90+

Subcategory Groupings (I, II, VI)

Subcategories

	Devpmtl Middle	Open Lower	Trad. Middle	Trad. Lower	F	t_1	t_2
I_1	5.0	17.1	30.5	30.8	1.74	1.13	1.49
I_{2-7}	64.0	38.2	59.5	52.5	0.72	0.97	0.85
II_1	0.5	0.6	0	0.3	--	--	--
II_{2-7}	0	0.2	1.5	0	--	--	--
VI_{1-8}	4.5	2.6	17.0	1.5	4.28*	3.39**	0.32
VI_9	3.0	16.3	37.5	47.5	4.58*	1.59	3.05**

Table 3

Mean Frequency of Child-Initiated Behaviors in Each of Category by Group

Categories	Devpmtl Middle	Open Lower	Trad. Middle	Trad. Lower	F	t_1	t_2
I	335.5	272.8	55.0	122.8	11.11**	4.24**	3.80**
II	88.0	61.8	19.0	31.0	--[a]	--[a]	--[a]
III	308.5	240.7	86.5	134.5	22.20**	5.66**	5.07**
IV	1.0	7.7	7.0	15.0	--[a]	--[a]	--[a]
V	53.5	44.4	10.0	22.3	--[a]	--[a]	--[a]
VI	140.5	109.4	24.0	57.3	3.12+	2.88*	1.81+
Total	927.0	736.8	201.5	832.8	25.08**	6.32**	5.43**

Subcategory Groupings (I, II, VI)

Subcategories	Devpmtl Middle	Open Lower	Trad. Middle	Trad. Lower	F	t_1	t_2
I_1	75.0	87.3	22.5	48.8	12.25**	5.28**	4.09**
I_{2-7}	260.5	185.4	32.5	74.0	7.95**	3.25**	3.08**
II_1	43.0	38.1	12.5	26.5	--[a]	--[a]	--[a]
II_{2-7}	45.0	23.7	6.5	4.5	--[a]	--[a]	--[a]
VI_{1-8}	138.0	80.7	19.5	19.5	9.78**	2.67*	3.47**
VI_9	2.5	28.8	4.5	37.8	1.38	1.23	0.59

a. These values are essentially equivalent to those presented in Table 1a.

Table 4

Mean Frequency of To-Adult Behaviors in Each Category by Group

Categories	Devpmtl Middle	Open Lower	Trad. Middle	Trad. Lower	F	t_1	t_2
I	132.0	82.6	90.0	93.3	0.59	0.20	0.37
II	20.0	11.1	9.5	7.5	2.20	0.36	1.05
III	54.5	36.8	40.5	40.8	0.94	0.35	0.49
IV	0	0.8	1.5	8.8	7.72**	0.24	2.73*
V	0.5	1.1	0.5	0.8	0.11	0.41	0.32
VI	20.0	21.2	56.0	53.3	3.71*	2.72*	2.72*
Total	227.0	153.6	198.0	201.3	0.96	0.84	1.18

Subcategory Groupings (I, II, VI)

Subcategories	Devpmtl Middle	Open Lower	Trad. Middle	Trad. Lower	F	t_1	t_2
I_1	17.5	29.1	33.0	35.5	--	--	--
I_{2-7}	114.5	53.4	57.0	57.8	1.60	0.74	0.22
II_1	6.5	6.3	3.0	6.3	--	--	--
II_{2-7}	13.5	4.8	6.5	1.3	6.12**	0.66	1.76
VI_{1-8}	16.5	5.0	24.0	3.5	3.88*	2.90*	0.30
VI_9	3.5	16.2	32.0	49.8	--	--	--

Table 5

Mean Frequency of To-Child Behaviors in Each Category by Group

Categories	Devpmtl Middle	Open Lower	Trad. Middle	Trad. Lower	F	t_1	t_2
I	260.5	234.8	40.0	91.0	7.48**	3.55**	3.40**
II	68.5	51.2	11.0	23.5	12.87**	4.33**	3.88**
III	255.0	205.1	47.5	91.3	28.05**	6.57**	6.22**
IV	1.0	6.2	3.0	8.0	0.82	0.71	0.51
V	22.5	29.4	0.5	14.0	5.42*	3.58**	2.48*
VI	107.5	82.2	18.5	24.8	2.92+	1.85+	2.17*
Total	720.0	609.0	120.5	252.5	21.04**	5.81**	5.52**

Subcategory Groupings (I, II, VI)

Subcategproes	Devpmtl Middle	Open Lower	Trad. Middle	Trad. Lower	F	t_1	t_2
I_1	61.0	72.9	12.5	40.0	--	--	--
I_{2-7}	199.5	161.9	27.5	51.0	5.52*	2.75*	2.96*
II_1	37.0	32.2	9.5	20.3	--	--	--
II_{2-7}	31.5	19.0	1.5	3.3	12.73**	3.46*	4.05**
VI_{1-8}	107.0	66.1	11.0	9.0	6.83**	2.39*	3.76**
VI_9	0.5	16.1	7.5	15.8	--	--	--

Table 6

Mean Frequency of To-Self and By-Self Behaviors in Each Category by Group

Categories	Devpmtl Middle	Open Lower	Trad. Middle	Trad. Lower	F	t_1	t_2
I	8.0	4.9	2.5	17.0	1.16	0.25	1.66
II	0	0.2	0	0.3	0.17	0.49	0.08
III	4.0	5.1	7.5	7.5	2.94+	0.74	2.78*
IV	0	0.7	0.5	1.3	1.07	0.25	1.15
V	26.0	14.6	11.0	7.8	1.44	0.44	1.09
VI	20.5	23.9	2.0	26.8	0.90	1.52	0.26
Total	58.5	49.4	23.5	60.5	0.27	0.78	0.54

Subcategory Groupings (I, II, VI)

Subcategories	Devpmtl Middle	Open Lower	Trad. Middle	Trad. Lower	F	t_1	t_2
I	1.0	0.7	0.0	1.0	--	--	--
I_{2-7}	7.0	4.2	2.5	16.0	1.03	0.19	1.65
II_1	0	0.1	0	0.3	--	--	--
II_{2-7}	0	0.1	0	0	0.26	0.54	0.71
VI_{1-8}	19.0	12.1	1.5	8.5	1.62	0.61	0.71
VI_9	1.5	11.8	0.5	18.3	--	--	--

Table 7

Mean Frequency of Choral Responses in Each Category by Group

Categories	Devpmtl Middle	Open Lower	Trad. Middle	Trad. Lower	F	t_1	t_2
I	4.0	5.9	12.5	4.8	0.60	1.13	0.25
II	0	0	0	0	--	--	--
III	4.0	1.1	11.5	3.3	7.90**	4.84**	1.30
IV	0	0	2.0	0	15.30**	6.52**	--
V	0	0	0	0	--	--	--
VI	0	1.0	2.0	1.5	0.52	0.74	0.48
Total	8.0	8.0	28.0	9.5	2.95*	2.97*	0.28

Subcategory Groupings (I, VI)

Subcategories	Devpmtl Middle	Open Lower	Trad. Middle	Trad. Lower	F	t_1	t_2
I_1	0.5	1.8	7.5	3.0	--	--	--
I_{2-7}	3.5	4.1	5.0	1.8	0.20	0.22	0.74
VI_{1-8}	0	0	0	0	--	--	--
VI_9	0	1.0	2.0	1.5	0.60	--	--

Table 8

Child Behavior Scan:
Mean Percent of Behaviors by Group

Behaviors	Devpmtl Middle	Open Lower	Trad. Middle	Trad. Lower	F	t_1	t_2
Activity Involved	91.1	85.4	86.1	75.3	1.49	0.04	1.71+
Observing	3.4	4.9	5.5	11.2	2.24	0.12	0.14
Social/ Physical	5.7	9.0	7.7	11.6	0.52	0.11	0.70
No Observable Focus	0.3	0.1	0	0.3	--	--	--
Destructive Behavior	0.3	0.5	0.8	1.6	0.77	0.43	1.22

Table 9

Type of Activity by Group

		Devpmtl Middle	Open Lower	Trad. Middle	Trad. Lower	F	t_1	t_2
Academic ←	No or 2D	28.8	50.7	31.6	68.0	4.30*	1.64	2.0 +
	3D	22.3	9.5	0.3	0.3	3.97*	1.50	2.00+
Non-Academic ←	Blocks, Arts, Crafts	16.5	20.2	4.5	5.6	1.87	1.64	2.00+
Teacher Directed ←	Total Group	32.3	19.5	63.6	26.1	3.70*	3.33**	0.73

Table 10

Activity Characteristics by Group

		Devpmtl Middle	Open Lower	Trad. Middle	Trad. Lower	F	t_1	t_2
Adult Role ←	Supporting	20.3	12.0	0.8	8.3	1.64	1.61	0.63
	Directing	34.8	26.8	76.8	51.5	5.91**	3.90**	2.50*
	No Adult	45.0	61.1	22.5	40.2	3.88*	3.14**	2.14*
Dimensionality of Materials ←	2D	63.5	75.1	90.3	93.5	2.14	1.00	2.02+
	3D	62.6	23.0	6.8	6.3	8.62**	1.84+	2.61*
	2D & 3D	26.1	6.4	1.5	6.0	4.08*	1.04	0.34
	Neither 2D nor 3D	0	8.2	4.5	6.2	0.36	0.32	0.32
Perceptual Modes ←	Auditory	66.3	47.1	63.1	48.5	1.44	1.52	0.12
	Tactile	55.6	23.9	2.1	7.3	9.93**	2.91*	2.81*
	Visual	100.0	91.4	95.6	93.8	0.42	0.43	0.30
	Kinesthetic	7.9	6.5	1.0	0	1.43	1.24	1.70+
	Gustatory/ Olfactory	6.6	0.2	0	0	3.65*	0.10	0.14
Representational and Real ←	Sign/Symbol	62.8	63.0	85.2	87.5	2.70+	1.63	2.50*
	Free represent	54.1	39.5	32.9	13.8	5.64*	0.62	3.53**
	Real	15.4	6.3	0	0	1.78	1.10	1.42

4

Construct Validity: The Relation Between DCB Scores, and Assessments of Teacher Behavior

Given the basic assumption, in the development of the DCB Observation System, that children's classroom behaviors reflect the teacher's behaviors, attitudes, and curriculum emphases, an important aspect of this study was directed at examining the relationship between teacher behavior and children's interactions in a sample of the classrooms observed in this study. We conducted an independent, detailed assessment of teacher performance in 12 of the 17 classrooms of the study, with the following distribution of teachers among the four groups studied: Developmental Middle--2; Open Lower--5; Traditional Middle--1; Traditional Lower--4.

Measurement of teacher behavior was made by applying rating scales (Stern, 1967) to running records of teacher behavior. All 12 teachers in this phase of the study were observed for a period of 90 minutes on each of two or three different days. Each of the two observers[16] observed all of the 12 teachers. During each 90-minute observation, the observer strove to record as much as possible of what the teacher said, and to include facial expression, tone of voice, and other expressive aspects of behavior. Content of the lessons and assignments was noted in detail. Supplementary checklists were used to record the activities of groups, etc.

Upon completion of all the observations, ratings were assigned to the 12 teachers on each of 27 scales (see Table 11), based on the coded and scored material derived from the records. The data from each day of observation were rated separately, and afterwards a combined rating of all the data was assigned for each scale to each teacher.

The relationship between DCB scores and ratings of teacher behavior was studied by means of linear correlation methods. Of 114 correlation coefficients computed, all but two are in the expected direction (see Table 12). Almost two-thirds of the total are statistically significant.

The rating of *Richness of Curriculum* (#1) was found to be highly related to the *Total Frequency* of DCB scores and also to Categories I *(Gives Information)*, II *(Asks Questions)*, and VI *(Represents and Symbolizes)* of the DCB. Various Scan scores also yielded relatively high correlations with the rating of *Richness of Curriculum*. The highest correlate of this measure of teacher behavior among DCB scores, it is interesting to note, is the frequency of

continued on page 45

16. The two observers were not involved in the DCB study and consisted of the developer of the teachers' scales and a graduate assistant.

Table 11

List of School Environment Inventory Scales

I. *Curriculum*
   Scale 1. Richness of Curriculum

II. *Predominant Mode of Teaching*
   Scale 2. Degree of Integration of Curriculum
   Scale 3. Teacher's Emphasis on Verbal-Symbolic Mode
   Scale 4. Degree to which Teacher is Interested in Children's Thinking Process vs. Correct Answers
   Scale 5. Degree to which Teacher Emphasizes Learning by Rote
   Scale 6. Degree to which Teacher Actively Encourages Children's Curiosity, Exploration of the Environment and Experimentation with Materials and Processes
   Scale 7. Teacher's Emphasis on Development of a Variety of Cognitive Skills, Processes, and Styles
   Scale 8. Range of Verbal Response and Expression Accepted, Encouraged or Stimulated by Teacher

III. *Degree and Mode of Organization of Teaching*
   Scale 9. Degree to which Teaching is Conducted on an Individual Basis
   Scale 10. Degree of Organization
   Scale 11. Degree to which Children are Allowed to Choose Their Own Activities
   Scale 12. Flexibility of Room Arrangement and Use

IV. *Quality of Relationship, Interaction with Children*
   Scale 13. Dominance of Teacher
   Scale 14. Formality/Informality of Conduct of Class
   Scale 15. Degree to which Teacher Attends to Child-Initiated Communications (or Attempts to Communicate), Verbal or Nonverbal
   Scale 16. Degree to which Teacher Acts Toward Children in a Differentiated Manner
   Scale 17. Approval/Disapproval Expressed by Teacher
   Scale 18. Degree to which Teacher Explains Reasons

V. *Characteristics of the Physical Environment*
   Scale 19. Size of Room
   Scale 20. Room Arrangement (Conventional vs. Activity-Oriented)
   Scale 21. Appearance of Room: Cluttered/Spacious
   Scale 22. Cheerfulness of Room
   Scale 23. Number of Children's Products Displayed
   Scale 24. Variety of Children's Products Displayed
   Scale 25. Degree of Emphasis on Display Per Se
   Scale 26. Number of Displays Other than Children's Products
   Scale 27. Variety of Displays Other than Children's Products

Table 12

Correlations Between DCB Scores and Teacher Ratings

	Teacher Rating Scales[1]										
	1	2	3-4	5	6	7	8	9	11-12	13	14
DCB Form											
Total[2]	.80**[3]	.74**	.58*					.65**	.39		.46
Cat I											.34
Subcat I_1(% of I)		.71**									
Subcat I_{2-7}	.57*	.69**	.74**	.52*	.28	.78**	.46		.23		.41
Subcat I_{2-7}(% of I)					.34						
Subcat I_3			.65*	.66**							
Subcat I_2				.79**			.51*				
Cat II	.85**	.75**	.73**	.56*		.64*	.55*		.69**		.67*
Subcat II_{2-7}	.92**	.77**	.86**	.65**	.27	.66**	.48		.74**		
Subcat II_3				.47							
Subcat II_7				.63*							
Cat III								.70**	.48		
Subcat III_4											
Subcat III_6											
Subcat III_8											
Cat IV										.33	
Cat V						.15			.75**		.60*
Subcat VI_{1-8}	.87**	.82**				.67**	.62*	.91**	.54*		
Ch-Ch Interactions											
Classroom Scan											
Child Behavior											
Activity Involved	.68**		.64*								.58*
Social/Physical								.55*			
Destructive								.33			
Activity											
Adult Role: Directive					.17	.12	-.17	.41			
3D	.70**		.88**								
Tactile	.75**		.87**								
Kinesthetic	.68**		.71**								
Gustatory/Olfactory	.44		.73**								
Free Representation	.78**		.80**								
Real	.57*		.74**								

Table 12 (Cont'd)

	Teacher Rating Scales[1]									
	15	17	18	19	22	23	24	25	26	27
DCB Form										
Total[2]	.70**	.59*	.49		.13				.83**	
Cat I			.45							
Subcat I_1 (% of I)										
Subcat I_{2-7}			.64*		.11	.32				
Subcat I_{2-7} (% of I)										
Subcat I_3										
Subcat I_2										
Cat II					.20	.48				
Subcat II_{2-7}						.48				
Subcat II_3										
Subcat II_7										
Cat III	.69**	.65*	.68**	.71**	.21	.39				
Subcat III_4				.46						
Subcat III_6				.45						
Subcat III_8				.69**	.27					
Cat IV					.40					
Cat V	.83*	.66**			.06	.11		.67**		
Subcat VI_{1-8}	.85**									
Ch-Ch Interactions	.72**	.66**								
Classroom Scan										
Child Behavior										
Activity Involved										
Social/Physical										
Destructive										
Activity										
Adult Role: Directive								.47	.65*	-.62
3D								.74**	.61*	
Tactile								.72**	.64*	
Kinesthetic								.67**	.37	
Gustatory/Olfactory										
Free Representation										
Real								.76**		

higher-level questions, i.e., Category II, Subcategories 2-7. The rating of *Integration of Curriculum* (#2) produced a similar, but slightly lower, pattern of intercorrelation with DCB scores.

The degree to which a teacher emphasizes the *Verbal-Symbolic Mode* as opposed to the experiential mode (#3) was found to be highly correlated with DCB scores dealing with *Total Frequency*, Category I, Subcategory 3 *(Function, Process, Instructions)*, Category II, and quite extensively with the series of Scan scores.

The degree of interest in *Thinking Process vs. Correct Answers* (#4) was found to be highly correlated with Categories I and II and, to an even greater degree to Category I, Subcategories 3 *(Function, Process, Instructions)* and 7, *(Causal Reasoning)*, and Category II, Subcategory 7 (questioning behavior involving *Causal Reasoning)*.

Rating the degree of emphasis on *Learning by Rote* (#5) yielded correlation coefficients in the expected direction, but none of sufficient magnitude to be regarded as different from zero. On the other hand, the rating of *Encouragement of Curiosity, Exploration, Experimentation* (#6) was found to be strongly associated with Categories I, II, and VI *(Represents and Symbolizes*, with Subcategory 9 excluded). The rating of *Emphasis on Development of a Variety of Cognitive Skills, Processes and Styles* (#7) achieved a similar but lesser pattern of intercorrelation. The *Range of Verbal Response and Expression Accepted, Encouraged or Stimulated* (#8) was found to be almost perfectly correlated with Category VI (1-8) and highly correlated with *Total Frequency* and Category III *(Expresses)*.

The *Degree to which Teaching is Conducted on an Individual Basis* (#9) was found to be related especially strongly to Categories II *(Asks Questions)* and V *(Organizes and Manages)*. A similar pattern of intercorrelation was found with the *Degree to Which Children Are Allowed to Choose Their Own Activities* (#11). However, a rating of the *Degree of Organization* (#10) was not found to be highly related to DCB scores.

A cluster of ratings concerned with the quality of teacher's relationships with children were found to correlate substantially with *Total Frequency* of DCB scores (of children's interactions) and with Categories III *(Expresses)* and V *(Organizes and Manages)*. Among these were the *Dominance of the Teacher* (#13), which correlated highly with *Total Frequency*, Categories III and V, and the frequency score of Child-Child behavior. The *Formality/Informality of Conduct of Class* (#14) obtained a very similar pattern of intercorrelation, but on a slightly smaller scale. Both *Attendance to Child-Initiated Communications* (#15) and *Degree to which Teacher Acts Toward Children in a Differentiated Manner* (#16) were found to be highly correlated with Category III, as well as other DCB scores. Ratings of *Room Arrangement* (#20) and *Appearance of Room* (#21) were both found to be highly correlated with Cate-

(For Table 12)

[1]The numerical identification of rating scales corresponds to that shown in Table 11.

[2]Unless otherwise indicated, the DCB score is expressed in the form of frequency.

[3]Signs reflected.

*$p < .05$
**$p < .01$

gory III, as well as with other DCB and Activity Scan scores.

Discussion

The results of this investigation indicate that the two bodies of data--an assessment of teaching behavior and the study of classroom interaction--although derived from different sources, are strongly interrelated. Both DCB Category scores and Scan data were found to be highly correlated with ratings of teacher behavior along the Stern scales.

The results corroborate in a more systematic fashion the findings of previous studies with the DCB. The DCB's study of characteristics of children's classroom group interaction reflects the manner in which their classroom is organized and managed by their teacher. The present findings indicate that a differentiated assessment of teaching performance, conducted within a framework that records nontraditional as well as traditional conceptions of teacher behavior, distinguishes among teachers in a way that is detectable, with great fidelity, in the results of an observation system that focuses on the group interaction of children.

Reliability of the DCB[17]

Since the reliability of an observation procedure is an essential basis of its effectiveness, it is necessary to assess its magnitude. In a sense, the existence of generally acceptable levels of reliability of the DCB in the present study was demonstrated by its ability to distinguish among independently differentiated groups of classrooms. It is useful, however, to go beyond a mere demonstration of adequate levels of reliability, to the point where it is possible to estimate the magnitude of various sources of error. In the study of classroom phenomena, two major sources of error can be identified: variation in this phenomena to be observed and variation in the observer(s). Therefore, the following procedures were followed: Each classroom was observed on two occasions. The first observation was conducted by a single observer. Two observers, one of whom was the same individual who had conducted the first observation, observed simultaneously during the course of the second observation. This design made it possible to assess the degree of agreement (1) within the same observer on two different occassions, (2) between two different observers on the same occasion, and (3) between two different observers on two different occasions.

The overall pattern of results indicate that the reliability of the DCB is high. Only one of the six major categories--VI *(Represents and Symbolizes)*--failed to achieve satisfactory levels of reliability. When the category was subdivided and its divergent component (Subcategory 9) removed, its coefficient rose substantially.

17. For a full report of the methodology and findings of the reliability study, see Ross, Zimiles, Gerstein *Children's Interactions in Traditional and Nontraditional Classrooms*, 1975.

5

Summary and Implications

This report may be viewed simultaneously as an analysis of children's classroom interaction which is more definitive than heretofore obtained, and as a test of the efficacy of the DCB Observation System as a method of measuring these interactions.

ANALYSIS OF CLASSROOM INTERACTION

First, let us consider the findings relating to the children's interaction in contrasting educational settings, which show both basic commonalities and striking differences. In the total amount of interaction recorded, the groups differ consistently and by wide margins. The total frequencies found in the traditional groups are only a small proportion of the total of the Developmental Middle group, and are also greatly exceeded by the Open Lower group.

On the other hand, the general distribution of behaviors among the six major categories of the DCB is surprisingly similar in all four groups with the percent scores falling within a relatively narrow range. Approximately 40 percent of children's interactions entailed information-giving, from 6-to-9 percent involved questioning behavior, and 29-to-31 percent were forms of *Expresses*. Destructive behavior accounted for only from .1-to-3 percent of total interactions, and organizing and managing behavior from 3-to-6 percent. The category with greatest variability was *Represents and Symbolizes*, with scores ranging from 15-to-21 percent. Thus, there has emerged an overall pattern representing the general content of children's classroom interaction.

However, when the content of the interactions is more closely analyzed, important qualitative differences among the four groups are seen. In the classrooms of the traditional groups, for example, a much larger proportion of all *Gives Information* interactions was concerned with rote and routine behaviors compared to classrooms of the nontraditional groups. In both nontraditional groups, too, most of the cognitive statements were distributed among subcategories representing higher-level behaviors. The proportion of questioning behavior that dealt with routine inquiries was highest in the Traditional Lower group and lowest in the Developmental Middle group. The traditional groups' expressive interactions more often in-

volved expressions of needs (social, physical, and task-related), whereas the nontraditional groups had a greater proportion of expression of preferences, of feelings and attitudes, and of concern for others. The largest differences in subcategory patterns occurred in relation to the category concerned with representational and symbolic behavior. Virtually all of the interactions of the two traditional groups involved reading-drill activities, while the bulk of these behaviors in the Developmental Middle group and a sizable proportion of those of the Open Lower group included forms of dramatic and creative expression and a much wider variety of experiences involving symbolization.

These group differences are magnified when the source and direction of interactions are examined. The single greatest difference found among the groups is the degree to which the interactions were spontaneously initiated by the children rather than elicited by adults. When the analysis is limited to communications elicited by adults, the amount of interaction recorded in the four groups is not very different. However, when child-initiated interactions are compared, enormous differences are to be found among the groups. By an overwhelming margin, the nontraditional groups, particularly the Developmental Middle group, exceed the traditional groups in frequency of child-initiated as well as To-Child interactions. Moreover, the large number of child-initiated interactions found among the nontraditional groups entail information-giving and questioning behaviors, which are primarily concerned with higher-level cognitive interactions. These behaviors account for the bulk of the differences among the groups.

The distinctive features of the four groups are summarized in the following profiles:

Developmental Middle

The two classrooms that comprised the Developmental Middle group are distinguishable from the other groups not only in terms of educational approach, i.e., developmental-interaction, but also by the fact that the classrooms were located in two independent schools subscribing to this particular educational approach, with supportive administrators. The children were predominantly white and from middle-income families.

These classes are characterized by the largest volume of interaction recorded in the study, particularly cognitive interactions (giving information and asking questions), which entail higher levels of functioning. When giving information, these children are much more often involved in behaviors relating to prediction, function, process and relationships. In addition, this is the only group that engages in substantial amounts of causal reasoning and problem-solving.

The type of questions asked are more diverse than those asked by the other groups, and involve higher-level

subcategory content much more often, with considerably fewer inquiries of a rote and routine nature. The expressive interactions far more often involve expressions of feelings and attitudes, and convey affection, warmth, and humor, and concern for others. There are the fewest instances of destructive behaviors, and the largest amount of children's interactions directed at resolving conflicts.

Perhaps most distinctive are the representing and symbolizing behaviors, with the greatest incidence of children directing and elaborating dramatic episodes and sharing symbolic experiences. Conversely, this is the only group that did not total substantial amounts of decoding and reading-drill behaviors.

Although the overall total of group interactions in the Developmental Middle group is extremely high, the number of adult-elicited interactions is relatively low. On the other hand, the children in this group direct more interactions to the adult than do the children in the other groups. Thus, it would appear, a greater proportion of behaviors addressed to adults in the Developmental Middle group are not evoked by adults; the children simply choose to communicate with adults more often.

Most of the adult-elicited behaviors in this group involve the transmission of information and virtually all of these involve higher-order cognitive responses. Similarly, more of the children's spontaneous interactions directed at the adult are in the cognitive domain and involve higher-order cognitive behavior. But it is the interactions that are initiated by children and directed at other children that predominate in the Developmental Middle group. It is in this sphere that the Developmental Middle group scored highest by far; child-initiated interaction is its hallmark.

Open Lower

The Open Lower group consisted of nine classrooms in three public schools with children of predominantly black and Hispanic low-income families. The teachers in this group had considerably less experience with nontraditional approaches to education than did the teachers in the Developmental Middle group, and were involved in an advisory program designed to support their professional development. In addition, they had to adapt their mode of teaching to the operational framework of public schools in a large urban school system which, for the most part, subscribed to and incorporated traditional modes of education.

The Open Lower group shows the second highest total of group interaction of the four groups. The proportion of interactions for each of the six major categories of content are virtually identical for the Developmental Middle and Open Lower classrooms. However, differences between the two nontraditional groups can be observed at the more differentiated subcategory level.

The Open Lower group resembles the Developmental Mid-

dle group and differs from the traditional groups in greater frequency of cognitive statements and larger proportion of higher-level interactions, with a wider distribution of behaviors among the subcategories. The children in this group ask more questions with a far greater frequency of higher-level forms than the children in the traditional groups; however, the proportion of higher-level questions is lower than that of the Developmental Middle group. The Open Lower group also resembles the Developmental Middle group in diversity of expressive behaviors, achieving the highest or second highest frequency in every subcategory, with feelings and attitudes, concern for others, and humor, warmth and affection expressed far more often in this group than in the traditional groups. It also has the smallest proportion of destructive acts of the three public school groups.

Children in this group command, direct, and suggest tasks more often than children in the other four groups. The distribution of representational and symbolic behavior, like that of the Developmental Middle group, is more widely distributed among the various subcategories, with far more interactions involving dramatic and creative expression than in the traditional groups. It differs from the Developmental Middle group, however, in that one third of the interactions in this category entail reading drill. (In the traditional groups, more than one half of the behaviors in this category were of this type.)

Despite the fact that the Open Lower group has the second highest overall total number of interactions, it has the lowest number of adult-elicited behavior, with its frequency slightly less than that of the Developmental Middle group. However, it differs from the Developmental Middle group in frequency of behaviors directed at the adult, totaling the least number of these behaviors in contrast to the Developmental Middle group, which has the greatest number. The content of adult-elicited behaviors, moreover, includes a greater proportion of statements in the cognitive domain, which represent a somewhat higher percent of higher-level behaviors than in the two traditional groups.

In general, this group shares with the Developmental Middle group a pattern indicating substantially greater numbers of child-initiated interactions, representing a far more differentiated and wider range of behaviors than the traditional groups, with a considerably greater proportion of higher-level cognitive interactions.

Traditional Middle

The Traditional Middle group was made up of two classrooms in one public school with children of predominantly white, middle-income families. The two teachers were highly experienced and had taught at this school for many years, utilizing a traditional approach.

This group recorded the smallest total of interac-

tions of all four groups, less than half of those recorded in the Open Lower group and slightly more than a third of the total obtained in the Developmental Middle group. Much of the work in this group is solitary and silent. In general, the distribution of behaviors among the six major categories follows the pattern described above as typifying all four groups. However, the proportion of questioning behaviors is slightly lower than that of the nontraditional groups, as are the proportions of expressive interactions and of organizing and managing behaviors. On the other hand, this group has a somewhat greater proportion of representing and symbolizing behaviors, mainly in the form of reading drill.

Although the children in this group asked the least number of questions of all four groups, the proportion of higher-order questions was greater than that of the Traditional Lower group and similar to that of the Open Lower group, while considerably smaller than that of the Developmental Middle group. The Traditional Middle group also had the fewest interactions involving the giving of information, and its proportion of statements entailing relationships or comparisons is extremely low.

In regard to expressive behavior, the Traditional Middle group had the lowest frequency of all four groups in each of the subcategories, except that of task-related needs. The restrained quality of these classrooms is further indicated by the relatively low frequency of organizing and managing interactions, with an unusually high proportion of these behaviors concerned with selecting and replacing materials. There are virtually no instances of interactions which involve commanding and directing, interactions which occur often in the other three groups. Almost all of the representational and symbolic interactions in these classrooms involve reading drill.

The Traditional Middle group has the highest proportion of interactions that were adult-elicited. It also has the fewest interactions initiated by, and directed at, children and is the only group in which the number of interactions directed at adults actually exceeds the number of interactions directed at other children. The distribution of the adult-elicited behaviors reflects the greater emphasis on reading drill in the traditional approach, and also represents a relatively smaller proportion of cognitive interactions. Most of the child-initiated interactions in this group entail expressive behaviors, which are mostly expressions of needs.

Traditional Lower

The Traditional Lower group consists of four classrooms in a public school with a traditional educational program attended by children of predominantly black and Hispanic low-income families. The teachers varied somewhat in experience but for the most part had considerably fewer years of teaching than the teachers in the Developmental

Middle and Traditional Middle groups.

Substantially more interactions are recorded in these classrooms than in the Traditional Middle group, but the overall total is closer to that group's total than to that of the Open Lower group. The distribution of behavior frequencies among categories is similar to that of the other three groups. Perhaps most deviant is the relatively high frequency of destructive behaviors. Although this highest group mean accounts for only 3 percent of the behaviors in the Traditional Lower group, it is substantially higher than the exceedingly low proportion of .1 percent obtained in the Developmental Middle group.

This group also had the greatest proportion of rote and routine behaviors in information-giving interactions, a trend accentuated in questioning behavior, with more than 85 percent of the questions raised of a routine nature. Similarly, interactions involving expressive behavior were primarily limited to expressions of routine needs and of complaints, with the smallest proportion of interactions involving expressions of feelings or attitudes of all four groups.

As indicated, this group had the highest percent of destructive behavior, with a relatively high frequency of challenge of classroom limits. Its organizing and managing interactions were for the most part limited to the children's commands and directions. Interactions involving representing and symbolizing behaviors were for the most part restricted to reading drill, with almost twice as many instances of this behavior occurring in this group as in any of the others.

As in the case of the Traditional Middle group, adults loom large in Traditional Lower group interactions; they both elicited and were the recipients of a substantial proportion of the total number of interactions recorded. Accordingly, this group had the greatest proportion, by far, of adult-elicited reading-drill behaviors. The adults also elicited the smallest proportion of higher-level interactions.

In addition to revealing important qualitative differences in the character of children's group interaction, the DCB analysis shows differences among groups that relate to the variety and nature of activities in each type of classroom setting. Classrooms in the nontraditional groups provided for a greater variety of experiences with many opportunities for work with concrete materials and live phenomena. Of these classrooms, those in the Developmental Middle group spent a greater proportion of its activities using all the perceptual modes; they registered a far greater variety of experiences with more opportunity for expression in free representational modes. The traditional classrooms were, for the most part, limited to work with two-dimensional materials.

The role of the adult also distinguished the four

groups with more adult-supported and fewer adult-directed activities in the nontraditional groups. In the Developmental Middle group, the adult role was more equally distributed among directing, supporting and no-adult situations. Both the Open Lower and Traditional Lower groups had greater instances of no-adult situations than did the Developmental Middle and Traditional Middle respectively, which suggests that teacher experience was a factor.

These tendencies appear to epitomize some of the differences among the four groups in regard to educational setting. Both quantitative and qualitative differences in children's group interaction are associated with specific characteristics of the learning opportunities provided in the classrooms and the role of the adult.

Unlike what might have been expected in a comparison of nontraditional and traditional classrooms, the main differences are not in the amount of expressive-social behavior, but in the amount of higher-level forms of cognitive behaviors and the degree to which symbolic and representational behavior is restricted to the decoding exercises associated with reading instruction.

The implications of these findings are particularly relevant to current issues. Although open education approaches have only recently been applied in public schools in this country, they have been subjected to severe criticism and challenge (see "Back to Basics Movement," as reported on in *The New York Times*, May 20, 1975). Yet there is not only a paucity of research on the relative efficacy of open education, there is also an appalling lack of definition and differentiation in the criticism of open education programs. The findings of this study provide us with a set of reference points which may aid in the effort to assess new programs. The need for further research in this area is self-evident.

THE DCB SYSTEM AS A METHOD OF MEASUREMENT

Let us now focus on the measurement credentials of the DCB Observation System. How trustworthy and useful are these findings? How accurate are the data that have been gathered? What problems have been revealed?

The reliability of the method is strongly supported. Strikingly similar results have been obtained with the DCB in previous studies (Ross, 1971, 1972). The assessment of reliability in the present study demonstrates that errors of measurement are not so great as to obscure major differences among the sample groups. In addition, data obtained from an independent assessment of teacher behavior in the study sample was found to be closely related to the DCB measurement of children's classroom interaction, thereby lending support to the basic assumption underlying this observation system, that is, that children's interactions reflect the teachers' values, attitudes, and curriculum emphases. Some

of the DCB results confirm, with greater precision and documentation, conclusions that have been widely held, and also support prior findings. These sources of data converge to substantiate the main findings of the study, thereby attesting to the validity of the DCB.

More problematic and requiring far more additional study is the basic question related to the limits imposed by a category system. The contribution of systematic methodology for observing classroom activities lies in its power to specify the scope of observation, systematize the data gathering process, and provide a conceptual framework that contributes a clear language, a way of ordering the observational events, and permits a level of quantification that enables us to compare the results of one observation with another. However, the process of imposing order in observational recording and supplying an unambiguous set of terms can result in a sharp limitation of its depth and profundity. Comprehensiveness, order, clarity of meaning, and quantifiability are purchased at a price. Questions regarding the depth and viability of the conceptual framework that underlies an observation system are, therefore, fundamental to an appraisal of the value of that system.

The DCB represents an attempt to provide a selective focus on classroom interaction that will produce evidence of the level of the children's functioning. As is the case with all evaluation instruments, choices were made on the basis of value judgments as to which aspects of classroom behavior would provide the most significant criterion measures. The highly detailed and differentiated character of the category system reflects the extent of concern with subtle, more complex, and relatively rare behaviors, as well as with those representing most typical and common interactions. Some of these infrequently occurring behaviors were found to be highly sensitive indicators of important differences among settings.

The completeness of this system has yet to be studied, however. In ordering the dimensions of group interaction in the classroom, has the DCB focused on the most important distinctions? What aspects of group interaction does it fail to record, and how might the scoring system be further refined to capture the most salient features of children's behaviors? In short, are the phenomena of children's group interaction fully revealed by the DCB method of study?

In examining the findings, we have been impressed with the juxtaposition of tremendous group differences and remarkable similarities. Is the uniformity of the pattern of distribution of the main category behaviors an important revelation regarding the universality of certain patterns of group interaction in the classroom, irrespective of the mode of education that is enacted, or are these remarkably similar patterns merely an artifact of the way the phenomena are defined and ordered in the DCB?

Some of the group differences found by the DCB might

have been anticipated, but their magnitude is startling. Few knowledgeable educators would have failed to predict that nontraditional classrooms would show a greater amount of child-initiated and child-directed interaction, but it remained for the DCB to document the extent of this difference and the nature of its content. This is one of many places where the systematic counting of instances of events enables the DCB to provide a quantitative assessment of phenomena which until now were left to impressionistic, qualitative evaluation.

Other differences found by the DCB were less predictable and illustrate how systematic observation can contribute new and more precise answers to longstanding questions. It is important to learn that the child-initiated forms of interaction frequently observed in nontraditional classrooms most often contain cognitive content, and that the cognitive interaction of nontraditional classrooms more often involve higher-level forms of intellectual functioning. The results also point to the lower incidence of destructive behavior in nontraditional classrooms.

It will require a great deal more experience with the DCB to learn to interpret the significance of its many scores. Thus far, it has yielded relative frequency scores in comparative studies. It remains to be seen whether, with the gradual accumulation of data, it will be possible to assign significance to absolute values of DCB scores obtained from single classrooms. As matters now stand, some data present problems of interpretation even when they have been gathered within a comparative framework. It would appear that in some instances differences between groups in the absolute frequency of particular behaviors are the important facts, whereas in other cases it is the difference in percent of occurrence that matters. In addition, while some of the differences between groups have been so large as to create the expectation of sizable differences between clearly distinguishable classrooms, it may be that for some dimensions of interaction only a small difference in frequency may be telling. It is also possible that among the less frequently occurring subcategories of behavior, the difference between complete absence in one case and occasional presence in another may have great dynamic significance. Only more extended experience with the DCB in relation to other kinds of data will clarify the interpretive significance of its various scores.* In the meantime, this instrument has served to identify and define the main dimensions of group interaction in the classroom and to provide an objective basis for measuring and comparing classroom interaction in various educational settings.

*Present work with the DCB is concerned with its application to the study of the individual child. Further plans call for the introduction of this system in staff development and pre- and inservice teacher education programs.

The original report from which this monograph was drawn, and which includes the Manual of Instructions for the DCB Observation System, the DCB Observation Booklet, the Classroom Environment Form, definitions for the DCB Form and the Classroom Scan, Activity Categories, an Activity Guide, and a School Environment Inventory, is available from the Research Division of Bank Street College of Education, 610 West 112th Street, New York, N.Y. 10025.

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