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THE EFFICACY OF MODELING, REHEARSAL, AND REINFORCEMENT EXPECTANCY FOR TRAINING CHILDREN IN CLASS-RELEVANT SKILLS

A DISSERTATION SUBMITTED TO THE GRADUATE DIVISION OF THE UNIVERSITY OF HAWAII IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN PSYCHOLOGY MAY 1975

By
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ACKNOWLEDGEMENTS

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Finally, appreciation is due the 48 delightful and talented children who served as subjects in this research. It is sincerely hoped that they learned as much from me as I did from them.
ABSTRACT

The present study assessed the efficacy of different training methods in effecting acquisition and generalization of a set of academic skills. Kindergarten and first grade children served as subjects, and the skills consisted of the following seven behaviors: staying in one's chair, attending to the teacher, working nondisruptively, being silent when the teacher spoke, answering questions, following directions, and raising one's hand to seek help. These were competencies considered by most educators to be basic to young pupils' learning readiness, to the extent that successful enactment of them facilitated the reception of content instruction as well as the mastery of higher order skills. The advantage of developing these behaviors in the repertoires of early elementary children was correspondingly underscored.

In terms of training, three distinct procedures were compared, involving simple instructions, instructions plus peer modeling, and instructions plus peer modeling plus subject rehearsal. A fourth group served as placebo controls. A second manipulation, crossed with training condition, ascertained the differential effects of introducing an expectancy of reinforcement, contingent on desired performance, against introducing no expectation. Subjects were randomly assigned to treatment condition and trained individually. All training was conducted by means of videotape with a trainer present to accompany subjects, and lasted approximately 15 minutes. Subjects' acquisition was measured immediately after the training, and their generalization was monitored subsequently in two 15-minute small group sessions, the first in the regular classroom.
and the second in a simulated class setting. These performance data were gathered at four phases—pre-training, post-training, post-retraining, and follow-up.

The major findings in the study were:

1. A near-significant training main effect for the behavior of staying in one's chair, and a significant training by reward interaction for question-answering behavior.

2. A significant main effect of reward expectancy in the regular classroom situation. Subjects who were given an expectation of reward exhibited appreciably more appropriate skills overall than those who received no expectation.

3. Significantly better acquisition scores at retraining than at training. Learning of the training content was generally at a high level for all subjects.

4. A significant main effect of study phase. Specifically, experimental subjects displayed a dramatic increase in desired responding after training, and leveled off (with slight decrements) at post-retraining and follow-up.

5. Significant changes in subjects' behaviors during each small group session. Subjects not only decreased their appropriate responses but also increased undesired ones as the session progressed.

6. A significantly higher level of appropriate responding in the simulated classroom setting than in the regular classroom.

7. A significant correlation between IQ and acquisition, but not between IQ and generalization nor between acquisition and transfer.
In general, no differences were evident among subjects across training condition, although the training by reward interaction approached significance for all skills combined; the data suggested that overall, instructions plus modeling plus rehearsal subjects who also anticipated a reward performed best, whereas their no-reward counterparts showed the least generalization. Results were interpreted in terms of both their theoretical implications and their practical significance for early childhood education. In line with this, the issue of conducting applied psychological research was discussed. It was suggested that future research focus on the following areas: clarifying the effectiveness of modeling and rehearsal procedures in the training of academic competencies, relative to not only their response development function but also their response evocation potential; exploring the effects of auxiliary methods such as provision of explicit prompts and memory codes; further investigating the variable of reinforcement expectancy; and researching ways to channel observational learning processes among children into the acquisition of useful skills within the classroom context.
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<td>KEEP</td>
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<td>ES</td>
<td>educational specialist</td>
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<td>S</td>
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CHAPTER I
Introduction

One of the most pressing issues facing social scientists today is the improvement of learning in schools. Professionals and laymen alike in nationwide communities acknowledge that education is beset with problems (Rohwer, 1970). These include the inadequacy of certain conventional teaching approaches, the dullness of many academic tasks, and more generally the absence of a stimulating educational environment in which students are motivated to learn. As a result, drop-out rates continue to be high, and even for those who complete a certain amount of schooling, there is enormous variation in the degree to which they are equipped with the requisite skills to adjust to the prevailing society.

It is clear that a critical assessment—or perhaps more accurately, ongoing assessments—of current educational practice is essential. Such an enterprise is the domain of not only schoolmen but also individuals in those disciplines which interface with education, especially psychology. For although the technology of "helping learners to learn" is far from developed, there is sufficient groundwork laid (in terms of discontents expressed, questions raised, and research attempted) that action proposals can be formulated, evaluated, and if successful, applied. Of course, psychology cannot claim to possess all, or even most, of the answers. It can, however, make tangible contributions, particularly through its foci on skill acquisition, individual-environment interaction, and research methodology
Efforts aimed at upgrading the quality and quantity of learning in schools can center on either or both of two parameters: the teacher, and the student. The former subsumes such aspects as teacher training, curriculum, and instructional strategies, while the latter consists of attempts to cultivate and bolster competencies in the student which facilitate his mastery over a given subject matter, or his learning in general. The present investigation selected the second approach, among a group of kindergarteners and first graders, with the view of imparting to them certain basic skills which would maximize the likelihood of their receiving content instruction and carrying out tasks in the desired manner. The training process involved delineating specific situation-response relationships which were appropriate in the classroom setting; having acquired these associations, pupils were measured on the extent to which they manifested the appropriate skills when similar eliciting conditions in the actual classroom were present.

Thus, the focus of the study was the pupil, and the objective was skill utilization in academic settings. In order for skills to be effectively performed, they must first be learned and retained by the pupil. Indeed, Bruner (1973) has argued that the principal emphasis in education should be on skill acquisition. Mastery of basic competencies equips the pupil with a conducive learning set, or "readiness," which enables him to develop higher skills. In a similar vein, Flavell (1970) points out that training entails stripping away performance obstacles so that the child's competence can be made manifest.
The present study attempted to achieve this, by a training regimen which specified both appropriate and inappropriate behaviors within the context of the classroom.

On a practical level, the rationale for selecting this research problem resided largely in the observation by many teachers and educational researchers that a great deal of time in kindergarten and lower elementary classrooms is spent on inducing pupils to adopt a suitable learning orientation—that is, to get themselves ready for work (deportment skills). Similarly, much class time and teacher efforts are evidently centered around instructing young pupils on how to attend and respond to directions (information-processing skills), and on how to solicit assistance whenever they need it (help-seeking skills). The argument then was that if the above classes of competencies could be imparted early and efficiently, with a minimum investment of time and resources, then more opportunities would be created in which pupils were able to devote themselves to important content learnings.

It should be noted that there was no implication that pupil behaviors falling outside of deportment, information-processing, or help-seeking categories were devoid of purpose and function. Indeed, there is much evidence (e.g., Hartup, 1970; Hoppe, Milton, & Simmel, 1970) to suggest that young children develop among themselves extensive social networks, with intricate patterns of rewards, punishment, communication and norms. Moreover, membership in these systems is likely to be an integral part of each pupil's overall adjustment in school. The intent of this study was not to undermine the significance of
social networks; on the contrary, an attempt was made to explore cer­
tain peer interaction patterns as a means to better understand the occurrence (or nonoccurrence) of the particular behaviors that were targeted in this investigation. Nor was it implied that all content instruction which occurred in the classroom was necessarily valuable. As suggested earlier, educators are increasingly trying to discover more effective ways of presenting academic material so that pupils can find learning both interesting and useful. This problematic aspect, however, was beyond the scope of the present study. The assumption made here was simply that certain content instruction was worthwhile, and to the extent a pupil could be equipped with skills to benefit from such instruction, his experience in school would likely be more meaningful.

Hence, the training conducted in this study was designed to instill useful discriminations in the pupil through associating specific stimulus situations in a given academic setting with particular sets of appropriate behaviors. The issue then centered around the research question: what training procedure would be most effective? Effectiveness was viewed in terms of two interrelated aspects—acquisition of skills, and their performance (or generalization) in the classroom. In reviewing the relevant training and educational literature, it was apparent that few, if any, guidelines have been promulgated as to which method may be most efficacious for training children in which competencies. Goulet (1970), for instance, notes that training studies in the past have not always specified their procedures adequately, and that there is a need to explore alternative strategies in training.
It was thus necessary to probe other areas of psychology for empirical leads, especially those pertinent to learning and performance patterns specific to young children.

An area which emerged as being exceedingly promising for the purposes of this study is that of modeling and vicarious processes. Since Miller and Dollard (1941) published their experimentation on social learning and imitation over three decades ago, a diversity of theoretical formulations of modeling phenomena has been advanced and concomitant empirical research has proliferated, particularly with children (reviewed by Akamatsu & Thelen, 1974; Bandura, 1969; 1971; Flanders, 1968; Thelen & Rennie, 1972; Zimmerman & Rosenthal, 1974). The key feature of such research has been modeling, which may be described as exposing the observer (subject) to a live or filmed sequence of events enacted by another person (the model). Through this exposure, the observer acquires or stores in memory what he has viewed (observational learning), and subsequently reproduces the behaviors of the model (imitation).

Under this rubric, studies have consistently shown that modeling, compared to simple verbal instructions or a no-treatment control condition, leads to greater acquisition and transfer by children on a variety of tasks and skills including prosocial behaviors (Hartup, 1970), attending skills (Glass, 1970), information-seeking responses (Rosenthal, Zimmerman, Durning, 1970), and linguistic styles (Whitehurst & Novak, 1973; Whitehurst, Ironsmith, & Goldfein, 1974), to mention but a few examples. In addition, certain factors when used in conjunction with modeling have been found to augment desired effects (i.e., greater
imitation). Two that have received considerable attention are rehearsal and positive reinforcement. The former involves the observer-subject practicing the modeled behavioral components during or after the modeling sequence, as a means to strengthen what he has learned through viewing, and the latter entails either rewarding the model for displaying a particular behavior (vicarious reinforcement), rewarding the subject for correct imitation (direct reinforcement), or informing the subject that favorable consequences would be forthcoming, contingent on appropriate performance (expectancy of direct reinforcement).

Thus, coupling modeling with rehearsal has been reported to result in greater imitation by children than either procedure alone (e.g., Rosenhan & White, 1967; White, 1972), and incorporating reinforcement in a modeling paradigm has been found to heighten appropriate performance (e.g., Cheyne, 1971; Liebert & Fernandez, 1970a; 1970b; Zimmerman & Pike, 1972). However, it should be pointed out that rehearsal and reinforcement have in some studies failed to augment imitation, as will be discussed in more detail later.

Despite the existence of a wealth of data generated by observational learning studies, few investigations have been made to ascertain the efficacy of modeling procedures for training children in classroom role behaviors. Previous research has usually either selected dependent variables which are largely irrelevant to the school setting (e.g., dial-reading, commodity preferences, button-pressing), or, 

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1The term "role behaviors" is used as it implies a set of appropriate functions rather than discrete, task-specific responses.
in instances where the variables may have a direct bearing on academic learnings (e.g., concept attainment, interrogative styles), failed to measure whether the procedures employed resulted in transfer of skills to the classroom. The present investigation attempted to address this issue by selecting as target behaviors skills or functions generally considered to be basic to a pupil's learning readiness. In terms of training, three distinct procedures (and a fourth control condition) were compared with one another, involving verbal instructions, instructions, instructions plus modeling, and instructions plus modeling plus rehearsal. A second manipulation, crossed with training condition, assessed the differential effects of introducing an expectancy of reward against introducing no expectation. Subject behaviors were measured at four intervals--pre-training, post-training, post-retraining, and follow-up. The resultant design was a 4x2x4 factorial, representing the two fixed factors of training condition (four levels) and reinforcement expectancy (two levels), and the repeated factor of study phase (four levels), respectively.

The overall goal of the present research was twofold: conceptually, it was of interest to determine which procedure would be most effective in promoting pupils' acquisition of the training content, as well as generalization of it to the classroom setting. On a more practical level, it appeared that some benefit might accrue to the educational community to the extent that the methods employed could be translated into useful applications. To facilitate this, the study's procedures were designed with a view toward maximum efficiency, in terms of simplicity and time investment, without sacrificing experi-
mental rigor. However, it should also be noted that inasmuch as empirical evidence from previous research is scanty—where the specific topic of this investigation is concerned—findings from the present study should be regarded as preliminary and requiring replication.

The next two chapters discuss theoretical conceptions of skill training, and observational learning in children, respectively. Relevant research in both areas, including studies pertaining to school-related skills, training, modeling, rehearsal, and reinforcement, are critically reviewed. The two chapters to follow center on the present investigation—its methods and results. Implications of the findings, problems attendant to conducting research in natural environments, as well as suggestions for further studies are treated in the sixth and concluding chapter.

It might be pointed out that although the format in Chapters II and III resembles that of conventional research reports (theory exposition, review of empirical studies, operational derivations), the orientation was somewhat different. Most psychological research has a theory, or components thereof, as the point of departure. In the present study, due to its greater applied focus (academic skill training in children), the practical issue constituted the starting point. Moreover, as will be shown in the pages to follow, there was no central theoretical framework and little research relating directly to the subject matter in question, although general discussions of the topic and attendant concerns have been considerable. Hence, the necessity arose to survey assorted and fairly diverse bodies of literature, in the attempt to seek out relevant theory and promising operationaliza-
tions. It is felt that this process is typical of a great deal of applied social research, and it is hoped that the reflection of the process in the following chapters might serve to highlight a different approach to experimentation in psychology.
CHAPTER II
Training of Academic Skills

Conceptualizations of Training

In the past, the term "training" was often used synonymously with "teaching" or "educating," referring to the generic process whereby certain instructional material is imparted to a learner or a group of learners. Currently, the notion of training has taken on a more specific focus, of which the defining features are concrete procedures and skill acquisition. From this perspective, training is viewed as the implementation of certain operations aimed at the cultivation or refinement of particular competencies on the part of the trainee.

The training literature now abounds with studies using a diversity of methods designed to achieve an equally broad array of goals and objectives—for example, training non-professionals as helping agents (e.g., Allerhand & Lake, 1972; Kreitzer, 1969; Riessman, 1967), building managerial skills through sensitivity group experiences (e.g., Argyris, 1964; Blake, Mouton, & Sloma, 1965; Campbell & Dunnette, 1968), bolstering graduate students' competencies in community psychology through an action-oriented curriculum (e.g., Cohen & Hirschowitz, 1972; Spielberger & Iscoe, 1972), training parents and teachers in child-management skills (e.g., Harris, Wolf, & Baer, 1964; Stover & Guerney, 1967; Walder, Cohen, Breiter, Daston, Hirsch, & Liebowitz, 1969), and so on. The proliferation of training studies seems to have been the result of at least two related developments: the attempt to discover novel and effective techniques for imparting a given subject matter to a particular
learner population, and the heightened recognition that problem-solving ability in any area is a direct function of the number of relevant skills the individual can bring to bear in that specific regard.

In the field of education, there exists a wide diversity of teaching or training methods, and an even larger spectrum of teaching styles. However, how many of these are truly effective, in terms of facilitating the learning of students, is open to question. A fair guess would be that there are not many of them. There are good teachers and not-so-good teachers, but, save on an intuitive basis, relatively little is known as to what specifically teachers must do to improve their students' learning and, equally important, how they should do it. For example, ability to dispense praises for high quality work may be a desirable teacher characteristic; however, mere knowledge of this will not, in and of itself, translate into effective practice unless a host of other relevant variables are considered (e.g., deciding for each student what constitutes good work, how to give the praise, at what point in time) and become part of the teacher's repertoire.

Methods aside, there is general agreement among educators that skill acquisition by students is of prime importance. Jerome Bruner, a psychologist whose years of research have been closely associated with education, expresses this viewpoint as follows:

The first (issue) has to do with what is taught. It would seem, from our consideration of man's evolution, that principal emphasis in education should be placed upon skills--skills in handling, in seeing and imaging, and in symbolic operations, particularly as these relate to the technologies that have made them so powerful in their human expression.

(1973, p. 476)

Accordingly, training entails "stripping away performance obstacles in
order to make manifest the child's underlying competence," (Flavell, 1970, p. 1043) as well as inculcating those skills which the child does not yet possess. For young children in school, these include attention, behavioral control, language, and conceptual abilities (Rohwer, 1970). The above may be seen as "early prerequisite competencies" which, once acquired, enable the child to progress to further and higher-order learnings. Training, then, seeks to establish these skills and facilitate their emergence. Along these lines, the concept of curriculum in lower elementary grades involves designing instruction such that mastery of basic skills by children leads, in turn, to mastery of more powerful ones, and eventually to the establishment of self-reward structures (Bruner, 1973). The ideal, of course, is that learning can be both reinforcing and useful to the student. How this can best be achieved—and the specific issue of how skill training may most effectively be conducted—remains largely an empirical question.

**Training: Research and Issues**

The present study represented an attempt to compare different methods for training children in academic skills. As such, it cut across a number of research areas (e.g., training studies, educational research) which appeared to have relevance. These will be briefly reviewed here, and their limitations—in terms of applicability to this study—noted. As suggested in the Introduction, there is no established theoretical or empirical base pertaining directly to the training of children in specific classroom skills. For this reason, it was necessary to scan different topic areas, each of which may only have peripheral relevance to the present investigation.
With respect to the general training literature, the majority of studies refer to an adult population, such as parents, teachers, management personnel, and service professionals (e.g., reviewed in Bennis, Benne, & Chin, 1969; Golann & Eis dorfer, 1972; Guerney, 1969; Hornstein, Bunker, Burke, Gindes, & Lewicki, 1971). Relatively few have young children as subject-trainees and at the same time focus on the classroom as the target situation. There is, of course, an abundance of research relating to behavior modification in academic settings (e.g., reviewed in Fargo, Behrns, & Nolen, 1970; Klein, Hap kiewicz, & Roden, 1973; Rickard, 1971). Generally, however, such research seeks to manipulate environmental variables (e.g., teacher praises, token economies), as distinct from working directly with the subject, and often centers on emotionally disturbed or severe problem children rather than more adjusted ones. The point is made here not to criticize behavior modification research, but to indicate that the orientation of the present study--direct skill training in children--is substantially different.

Another topic--one that has recently stimulated much interest and a fair amount of research--is that of training children in self-instructional strategies. Its chief proponent, Meichenbaum, has in conjunction with his colleagues generated a series of studies demonstrating the utility of this approach (e.g., Meichenbaum, 1973; Meichenbaum & Cameron, 1974; Meichenbaum & Goodman, 1969; 1971). Its basic paradigm involves training the subject to use (overt then covert) self-instructions to guide performance, by means of a systematic procedure in which the experimenter first demonstrates instructing himself
on a given task and then imparts this skill to the child, mediated by prompts and reinforcement which are gradually faded. Examples of self-directions are: "I have to go slowly and carefully," "Stop! I must think before I answer," and so on. As might be evident, research in this area has centered heavily on children subjects displaying impulsive behavior, with the objective of training them to proceed more carefully and reflectively on particular task assignments. This approach is discussed here because it has clear applicability to education; moreover, in contrast to some other training studies, its operations are well-specified and its efficacy has quite consistently, although by no means unequivocally, been shown. Nevertheless, it should be pointed out that the parameters of self-instructional training, in terms of the current available evidence, are relatively discrete from those in the present research. Specifically, this study was not restricted to subjects who exhibited impulsivity, and the variety of skills it attempted to train went beyond working on particular tasks (e.g., mazes or matching-to-sample tests). Thus, it appears that the degree of overlap between self-instructional research and this investigation was again rather small.

Findings from educational research have likewise provided few concrete guidelines for the purposes of the present study. Although certain investigations have isolated classroom-appropriate skills as the variables of interest, the nature of the research was usually correlational. For instance, Peterson (1971) found that listening-responding behavior among a group of first graders was related to the clarity and conciseness of the teacher's speech, and to the latter's ability to
secure the pupil's attention. Similarly, Friedman (1973) reports that the frequency of desired student-initiated verbalizations is associated with the teacher's reinforcement of spontaneous pupil activities. Another line of research, centering on general skills or role behaviors, has indicated that realistic perceptions of, and ability to perform appropriate role functions vary directly with age (Dubin & Dubin, 1965; Friedland, 1973), and that sex, social class, as well as intelligence are not crucial determinants of overall role learning (Heise & Roberts, 1970). While these findings shed some light on the covariates of general skill enactment, they unfortunately do not resolve the dual problem of how to efficiently establish specific skills in the first place (acquisition), and how to maximize the likelihood of their occurrence (performance) in a self-regulated manner.

More simply stated, and in the context of the present study, the issue may be expressed as follows: given a set of classroom role behaviors, what training method would best enable the child to (1) learn these skills and (2) generalize them to the classroom? Might simple verbal instructions suffice, for example, or are other, conjunctive procedures necessary? For reasons cited earlier, the training literature, as well as classroom studies, offered few clues to the answers of these questions (see Table 1).
Table 1
Summary of Training-and Skill-Related Research

<table>
<thead>
<tr>
<th>Research Area</th>
<th>Reasons for Limited Applicability</th>
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<tr>
<td>General training literature</td>
<td>Centers mainly on adult subject populations; has minimal focus on classroom skills.</td>
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<tr>
<td>Behavior modification in the classroom</td>
<td>Focuses largely on problem children; does not usually involve working directly with the subject.</td>
</tr>
<tr>
<td>Self-instructional training</td>
<td>Centers mainly on impulsive subjects; deals chiefly with skills specific to abilities tests.</td>
</tr>
<tr>
<td>Other research on skills/roles</td>
<td>Provides usually only correlational findings; does not address training issues directly.</td>
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Despite the absence of specific pertinent evidence from the research just surveyed, the existing literature did provide some leads into the general issue of maximizing training impact. This issue may be formulated as three related questions: first, through what medium should the training be conducted? Secondly, to what extent should the training process be active or passive in terms of subject participation? And thirdly, how might transfer of training be promoted? Each of these is discussed below.

1. Training medium.

Conventionally, training is conducted "live" whereby the trainer personally goes over the instructional content with the trainee(s). The major advantage of this is that the trainer can adjust his presentation to the specific demands of the situation. In contrast to this, automated forms of training have become increasingly prevalent, in which the trainee
is exposed to audio-visual materials (usually a film) by means of which
the instruction takes place. Interest in this latter form of training
was evident as early as the 1930's when investigators began to study
the effects of educational films on learning and retention (e.g., Hansen,
1933). Subsequently, a host of investigations have been made to test
the potential of using films for teaching a variety of subject matters,
such as motor skills (e.g., Karlin & Mortimer, 1963) and language (e.g.,
Knudson, 1971), and for augmenting learning in general (e.g., Maccoby
& Wilson, 1957; May & Lumsdaine, 1958). Assets of automated training in­
clude the novelty of the method, which might increase the trainee's
attention and interest, and its standardization, through which trainees
receive exposure to the identical training content. It also does not
require a trainer to be present, thus saving on manpower.

In the present study, the usage of training films was selected.
This permitted a fairly standardized training session for subjects in
the same treatment condition, as well as enabled the depiction of certain
contextual cues which, for reasons to be explicated later, would have
been difficult to display on a live basis. Additionally, a trainer was
present during each session to ensure that subjects exhibited the proper
attentional and acquisitional behaviors.
2. Active versus passive training.

A second consideration relating to the larger issue of training
efficacy deals with the degree to which the subject participates actively
in the training, as opposed to being a passive observer-listener. There
is evidence from the literature on programmed instruction (e.g., Kimble
& Wulff, 1961; Maccoby & Sheffield, 1961) that active rehearsal or
practice by the subject during training leads to greater retention than if such a component was absent. Practice seems to be especially helpful when the training objective is mastery of complex response sequences, as distinguished from simple content learnings. Indeed, behavioral rehearsal has been employed as a clinical procedure to treat problem areas such as aggression in children (Gittelman, 1965) and deficient interpersonal patterns in adults (Lazarus, 1966), with generally favorable outcomes. However, it should be noted that the precise nature and timing of rehearsal is crucial. As will be discussed in the next chapter, inter­spersed practice during training could hamper retention if it interferes with the processing of information being presented.

To ascertain whether rehearsal augmented the acquisition and generalization of class-related functions, it was incorporated as part of a training regimen in this investigation. Pitted against this were alternative training procedures in which the practice element was absent. Rehearsal, in this case, consisted simply of the correct enactment of each behavioral skill as it was presented during training. Procedures such as role-playing or extended practice were not involved.

3. Transfer of training.

In addition to the considerations of training medium and whether the training should entail subject participation, a third area of concern pertains to the transfer of what is learned. Clearly, if the training does not produce observable effects, if only on a short-term basis, then it must be judged a failure irrespective of how impactful it was at the moment of its occurrence. The question hence becomes one of facilitating generalization. Addressing this, Rohwer (1970) writes:
The last function of instruction is to provide conditions that increase the probability that what is learned will be appropriately transferred to contexts other than those of original learning. Often the conditions of initial learning have a bearing on the extent of transfer.

Indeed, one of these conditions is the extent to which the acquisition situation has properties similar to those of the performance situation, as learning experiments have shown. To increase the likelihood of transfer, it is necessary to "isolate the defining properties of the class of events to which the present (training) situation belongs" (Bruner, 1973, p. 232). This suggests that, quite apart from the training content, the type of contextual cues present will significantly govern subsequent transfer (Campione & Brown, 1973), as will the explicitness of descriptions or rules concerning how what is being learned is associated with the manner in which it should be demonstrated at a later time (Liebert & Allen, 1967; Liebert, Hanratty, & Hill, 1969).

In this study, an attempt was made to account for the above considerations. Each training film depicted a classroom scene consisting of a teacher and eight pupils seated around a large table, with work materials (cuisenaire rods) in front of them. This context was the one in which subjects would subsequently be observed for skill performance, and represented a conventional small group situation in class. In the film, the teacher (with whom subjects would have a group session following the training) began by specifying in simple terms that the instruction would be concerned with appropriate and inappropriate behaviors, and that it related to "working in a small group in class." At the conclusion of the individualized training, the trainer, who accompanied each subject, prompted all experimental subjects explicitly to transfer what they had
learned to actual small group work in the classroom.

These elements—setting, rule, and prompt—were designed to increase the probability of transfer. It was partly due to the desirability of depicting relevant setting variables in the training that the medium of films was chosen. It enabled the vicarious display of a small group situation which would have been highly impractical to implement on a live basis. An alternative strategy, that of training subjects in groups, would also have presented numerous difficulties, including inattention, various forms of interference, as well as certain logistical factors to be explicated in Chapter IV.

The foregoing discussion has delineated three general areas relating to training efficacy, and how the present experiment attempted to incorporate them. However, the specifics of training—that is, the independent variables in the study—remained to be resolved. It is this issue that the next two chapters will address.
CHAPTER III
Observational Learning in Children

Until the past decade, psychological research in the area of human learning has stemmed almost exclusively from two paradigms—classical and operant conditioning. It is evident, however, that behavior is a function not only of stimulus association and reinforcement, but also of observing others. As Bandura (1971) notes:

> It is difficult to imagine a culture in which language, mores, vocational activities, familial customs, and educational, religious, and political practices are gradually shaped in each new member by direct consequences of their trial-and-error performances without benefit of models who display the cultural patterns in their behavior.

(p. 1-2)

Through observation, learning takes place and the individual adds to his existing repertoire responses or response sequences, many of which may later have functional value. This phenomenon is particularly discernable in young children who acquire a great deal of their early verbal and motor skills via exposure to social models, such as parents, teachers, peers, and even strangers.

Considering the prevalence of observational learning in everyday life, it is somewhat surprising that educators have not generally employed modeling procedures more extensively as an integral feature of instruction. This is partially attributable to the fact that specific findings and guidelines in this area are relatively sparse, for despite the rapid proliferation of modeling studies in recent years, few have concerned themselves directly with educational issues, or more specifically, class-relevant skills. For example, dependent measures in this area of research
have included performance on a maze test (Rosenblith, 1959), dial-reading (Zimmerman & Rosenthal, 1972a), button-pressing (Thelen, Rennie, Fryrear, & McGuire, 1972), and picture preferences (Levy, McClinton, Rabinowitz, & Wolkin, 1974); in contrast, no investigation, to the knowledge of this writer, has centered on important classroom competencies such as attending to the teacher, working on one's assignment nondisruptively, carrying out directions given by the teacher, or asking for help when it is needed. This apparent lack of interface between modeling research and education may be traced to at least three related factors.

First, the overwhelming majority of observational learning studies is theory-based, rather than problem-centered. Variables of interest include the efficacy of modeling compared to another or other procedures, the effects of direct and vicarious consequences, the influence of coding or rehearsal processes, and so on. As such, the dependent variable is usually selected for its conceptual linkage or operational ease instead of its utilitarian value for the subject. Secondly, certainly not all psychologists who are involved in modeling research are also sufficiently concerned with classroom-related issues to integrate the two. Even if such an interest were present, not many investigators have the degree of access to pupils, resources, and technology necessary to systematically monitor the effects of their experimental procedures on subjects' in-class performance. Thirdly, studies in this area often entail the learning of completely novel responses, for theoretical or experimental reasons. Many academic skills, such as the ones enumerated earlier, do not fall in this category (except perhaps for very young children). However, it
might be pointed out here that their existence in pupils' repertoires does not guarantee they will be exhibited to the desired extent and at the appropriate times.

Hence, as in the case of training studies (Chapter II), there is little specific evidence generated by observational learning research which pertains directly to childhood education in the context of the classroom. Nevertheless, the potential of incorporating modeling procedures in class-related skill training is underscored: in the first place, the process of exposing subjects to social models has been consistently demonstrated to be an effective method to transmit a variety of behavior patterns (Bandura, 1969; 1971; Flanders, 1968; Zimmerman & Rosenthal, 1974); and secondly, in contrast to some training studies, the procedures involved are fairly well specified. These will be discussed at greater length in the section on modeling research. The next section reviews briefly alternative theoretical viewpoints of observational learning. ²

Theories of Observational Learning and Related Phenomena

As Bandura (1971) points out, the phenomenon of "learning by example" has been conceptualized by theorists in a diverse number of ways. Descriptive terms include "modeling," "observational learning," "imitation," "identification," "role-taking," "copying," and "social facilitation," among others. Although somewhat different conceptions have been advanced distinguishing the terms, for the most part the classifications are arbitrary (Bandura, 1971) and seem to be selected

²A more detailed analysis of modeling phenomena, theories, and issues may be found in Bandura, 1971.
more for their intuitive appeal than on empirical grounds. For the purposes of the present investigation, only the first three labels listed above were used. Specifically, modeling referred to the process whereby the child was exposed to one or more individuals exemplifying a particular behavior or response sequence. The learning or acquisition which took place as a result of such exposure was termed observational learning; and finally, subsequent reproduction of the modeled behavior(s) constituted imitation. Respectively, they represented the training stimulus, the cognitive event, and the desired response.

There are four major theories or classes of theories pertaining to this subject—Piaget's theory, affective-feedback theories, reinforcement theories, and social learning theory. Each of these is discussed below.

1. Piaget's theory.

Piaget's (1951) conception of imitative learning falls within his general rubric of developmental stages. At the sensorimotor stage, imitative responding by children is seen to be an alternating sequence in which the model must first repeat the child's spontaneous responses in order to elicit imitation in the child. In Piaget's view, children at this stage are restricted to reproducing only behaviors which they already possess, which they can see themselves perform, and which they actually displayed just prior to the model's reiteration. The line of reasoning is that children are able to assimilate only actions which correspond with existing schemas or structures.

As a child matures, he becomes more capable of differentiating his own responses from others', and learns to coordinate visual with
sensorimotor schemas. This results in the ability to imitate novel action sequences—ones which he cannot see himself perform. Still later, the child attains "representative imitation," by which he can imaginarily reproduce modeled events as well as engage overtly in imitative behaviors even when the model is absent from the scene.

Two weaknesses are apparent in Piaget's theory. First, the postulate that very young children can imitate only behaviors already in their repertoire seems to be contraindicated by findings that subhuman species can learn entirely new response chains through modeling (e.g., Adler & Adler, 1968), and by informal observations that infants are able to reproduce through modeling actions they have not previously displayed. Secondly, Piaget's account contains only passing mention of the variables influencing the performance of modeled events. For instance, external conditions affecting imitation, such as positive and negative consequences, are not addressed.

2. Affective-feedback theories.

These theories emphasize the mediating role of emotions or affect in imitative performance. According to Mowrer (1960), a chief proponent of this viewpoint, emotions are classically conditioned to the stimuli exhibited during modeling. For example, if the observer is rewarded continguously with the model demonstrating a particular behavior, this behavior takes on a positive valence for the observer who will later re-enact it due to its self-rewarding properties. Similarly, in the case where the model exemplifies a response and himself receives reinforcement, Mowrer contends that the observer intuits empathetically the rewarding experience of the model and this is likely to imitate the
response for its associated sensory feedback value. The theory applies also to direct or vicarious negative consequences, in which case the observer will suppress imitative tendencies.

Aronfreed (1969) expanded on Mowrer's theory by proposing that positive and negative emotional states become conditioned not only to modeling stimuli, but also to "cognitive templates" of imitative actions. In other words, imitation of a modeled response is governed by affective feedback from intentions and proprioceptive cues associated with the given response, where if the feedback is positive, the likelihood of imitation is high, and conversely. Hence, the determinants of imitation are seen as comprising three factors: the pairing of the modeled behavior with direct or vicarious consequences, the observer's intentions relative to the behavior, and peripheral sensory (proprioceptive) cues attendant to the behavior. These factors, in turn, are mediated by affective feedback, which ranges on a continuum from pleasurable to aversive.

Although the above theories introduce an interesting variable—that of emotional states—into conceptions of observational learning, they are also beset with certain limitations. Reviews of the influence of reinforcement on imitation (e.g., Bandura, 1969; 1971; Thelen & Rennie, 1972; Zimmerman & Rosenthal, 1974) have indicated that such effects are by no means uniform. For example, rewarding a model or observer enhances imitation in some cases, but has no effect in others. Along similar lines, affective-feedback analyses do not account for instances in which imitation occurs when neither the model nor the observer was reinforced. With respect to Aronfreed's conception, there is insufficient
specification of such factors as the characteristics of cognitive templates and how their affective properties are transferred to intentions and proprioceptive cues, thus making the theory difficult to confirm. Finally, these conceptualizations deal almost exclusively with emotional concomitants to modeling and imitation; they do not address other critical variables such as how modeled behavior is acquired, stored, and generalized.

3. Reinforcement theories.

The emphasis here shifts to the role of reinforcement as the governing factor of imitative behavior. In their classic work, Miller and Dollard (1941) define imitation as "a process by which 'matched,' or similar, acts are evoked in two people and connected to appropriate cues." (p. 10). Their conceptualization of learning consists of four separate components: drive, cue, response, and reward; of these, the critical factor is reward, which serves to increase the likelihood that the given (matching) response will occur after its initial appearance. It is further suggested that imitation itself can become a secondary drive if imitative behaviors are reinforced every time they occur.

Similarly, the Skinnerian analysis of imitation invokes the standard operant conditioning paradigm, consisting of the discriminative modeling stimulus, the overt matching response, and reinforcing consequences (Skinner, 1953). It differs from the conception of Miller and Dollard essentially only by its elimination of the drive variable. Differential reinforcement of imitative behavior is seen to result in the strengthening of rewarded responses and the weakening of those not
rewarded or punished.

Reinforcement interpretations of imitation deals principally with how matching behavior by an observer is influenced by outcomes directed at him. They do not, however, account for the subsequent occurrence of imitative responses when no reinforcement was dispensed to either the model or observer during the modeling sequence, or for the absence of imitation when rewards were administered to the observer. Perhaps more importantly, reinforcement theories do not explain the processes associated with observational learning— that is, how a novel behavior pattern is acquired through modeling in the first place, especially when the observer does not overtly rehearse it at this stage.

4. Social learning theory.

The social learning analysis of observational learning, as formulated by Bandura (1969; 1971), stresses both cognitive and environmental variables. Bandura proposes that observational learning and imitation are governed by four interrelated subsystems. The first of these is attentional processes, referring to the attention to, recognition and differentiation of the specific features of the model's demonstrations. Hence, simple exposure to a modeled sequence does not ensure that acquisition will take place; instead, "discriminative observation" is necessary.

The second set of factors influencing learning and imitation is retention processes. Bandura notes that "when a person observes a model's behavior without performing the response, he can acquire the modeled responses while they are occurring only in representational form," (1971, p. 17) which may be either imaginal (e.g., visual images)
or verbal (e.g., symbolic codes). Also facilitating retention are rehearsal operations, which may involve overt practice of the modeled behavior, or some form of covert process, such as repeating to oneself a particular summary code.

Another component function concerns motoric reproduction processes, whereby the individual guides his own matching behaviors by symbolic representations of modeled patterns. In other words, he activates what he has stored in memory as an aid to the enactment of matching responses. Of relevance also is the adequacy of his existing repertoire in relation to the response that is to be imitated. Clearly, a behavioral sequence that consists of novel components to the observer will be more difficult to reproduce than one which comprises pre-established responses.

The final subsystem in Bandura's formulation pertains to reinforcement and motivational processes. This set of factors subsumes direct and vicarious consequences, as well as expected outcomes, and is seen to influence imitation. Incentive conditions may also affect acquisition, or observational learning, by exerting some control over the selective perception and retention processes of observers.

In sum, social learning theory offers the most comprehensive analysis as well as superior explanatory power compared with other formulations of imitation and associated phenomena. Although this theory will no doubt undergo revisions and refinements as new research is generated, it currently appears to be the theory of choice: no other interpretation deals as extensively with both acquisition and performance of modeled events, or has received as much empirical support.
Research on Modeling and Imitation

The renewed interest in modeling and imitation during the past decade has stimulated an amount of research that is vast in both quantity and areas treated. Indeed, current issues of the *Journal of Personality and Social Psychology*, *Journal of Experimental Child Psychology*, and *Child Development*, among others, abound with articles on modeling, observational learning, and imitation. Although a comprehensive review of this literature might be informative, it would also detract from the focus of the present investigation. Hence, the review that follows will be selective rather than exhaustive. Specifically, the discussion (with some exceptions) will center only on research involving: (a) normal children subjects, (b) experimental manipulations which have at least an indirect bearing on training, and (c) dependent measures having at least peripheral relevancy to academic skills. This generally excludes studies dealing with adult and retarded populations, therapeutic investigations, as well as those employing target measures which are incommensurate with appropriate classroom performance (e.g., aggression). However, applying the above criteria still leaves a fairly substantial body of research, which may be subdivided into the following classifications: age- and sex-linked correlates of imitation, the efficacy of rule provision during modeling, the effects of guided practice or rehearsal, and the influence of vicarious and direct reinforcement on imitative performance.

1. Age- and sex-linked correlates of imitation.

Liebert, Odom, Hill, and Huff (1969) used subjects of different ages (means of 14, 8.5, and 5.8 years) in a study of modeled language
constructions; they found that the oldest group performed best in repeating the modeled sentences as well as in producing novel constructions corresponding to the type of sentence being modeled. Similarly, Laughlin, Moss, and Miller (1969) report that the ability to reproduce an effective information-processing strategy displayed during modeling was greater for seventh graders than for fifth or third graders. The strategy ("constraint-seeking") entailed asking the experimenter (who answered only yes or no) as few questions as necessary in order to deduce the nature of various stimulus drawings and words which were not visible to the subject. Additional data furnished by Leifer and his colleagues (1971) suggest that accurate re-enactments of modeled sequences of behavior are a direct function of age.

The above findings are not surprising inasmuch as older children are generally assumed to have developed greater linguistic and conceptual capabilities than their younger counterparts. A related finding of interest (Peifer, 1971) is that 6-year old male subjects exhibited greater imitative behavior when the film-mediated models were older (8 years) than when they were younger (4 years). Moreover, simply reporting a model to be older than the subject (when they were actually the same age) served to increase imitation. This suggests that social influence processes among children are related to the perceived status characteristics of the exemplar.

While the ability to imitate appears to vary directly with age, the sex of subjects, in most cases, does not make a difference. For instance, Lamal (1971), in another study on information-processing strategies, found that older children generally imitated what was
modeled more accurately but that males and females did not differ in their performance. The experiment by Laughlin, Moss, and Miller (1969), described earlier, had the same results. Also, no sex differences were found in the ability to reproduce modeled complex sentences among second and fourth grade children (Harris & Hassemer, 1972), or in the acquisition and transfer of a dial-reading concept by third and fifth graders (Rosenthal & Zimmerman, 1973). In contrast, however, two experiments offer data favoring the post-modeling performance of boys over girls. One involved solution of the Porteus Maze test (Rosenblith, 1959), and the other measured the production of complex sentences containing the past perfect tense (Rosenthal & Carroll, 1972).

The above results suggest that although males and females performed equally in the majority of studies, sex differences in imitative abilities may arise depending on the particular measure employed, or the type of phenomena being modeled. Further research may help to clarify this and other possible covariates of imitation, such as achievement scores and IQ. In a recent review of the literature on observer characteristics (such as states and traits) and imitation, Akamatsu and Thelen (1974) point out that there is considerable variance in the results of studies surveyed. They tentatively conclude that the influence of observer characteristics (presumably including age and sex) is greatest in situations where minimal information regarding desired behaviors is supplied, whereas when such information is abundantly present, the effects of observer-specific variables diminish.

2. Rules and codes as facilitators of imitation.

In a prototypic study, Zimmerman and Rosenthal (1972a) investi-
gated the effects of modeling and rule provision on the acquisition, generalization, and retention of a dial-reading, numerical concept among third grade children. Modeling entailed subjects witnessing an adult model displaying accurate dial-reading responses, and rule-provision involved imparting a descriptive summary to subjects on how the dial should be read. It was found that subjects profited from both modeling and rule provision, with the most marked learning, transfer, and recall exhibited by those subjects who underwent both procedures. In an extension of the study, with fifth graders and using a different but equally difficult task (form-selection concept), the above researchers (Zimmerman & Rosenthal, 1972b) found additionally that repeating the rule summary to subjects resulted in greater generalization of the concept than stating it only once.

The same trend of findings was obtained in studies employing verbal codes as an adjunct to modeling. Children who were given a complete coded summary of the concept, compared with those who received either no verbal code or a weak one, scored higher on acquisition and generalization measures (Alford & Rosenthal, 1973; Rosenthal, Alford, & Rasp, 1972). The efficacy of summary labels in facilitating subsequent matching behavior has also been found with college students on complex motor responses (Gerst, 1971).

In some cases, providing a "common dimension" or unspoken rule during modeling could also augment observational learning. For instance, Liebert and Swenson (1971) found that first graders exposed to a model who picked consistently either single or double items (from slides) had better recall of the model's responses than subjects who watched the model
select half single and half double items. The investigators suggest that children in the first group were able to abstract the rule governing the model's choices.

The facilitative effects of rule or code provision during modeling is perhaps best interpreted in terms of retention processes. By means of rules and codes, a great deal of information can be stored in memory and subsequently retrieved as a guide to response reproduction. The availability of such memory aids obviates the necessity to memorize verbally the entire response sequence, or construct a visual image of it, either of which would be a laborious and inefficient operation.

3. Effects of rehearsal on matching behavior.

The literature on programmed instruction (e.g., Kimble & Wulff, 1961; Michael & Maccoby, 1961) has amply demonstrated that practice during training can be an effective means of strengthening and stabilizing learning. Similarly, Bandura (1971) notes:

The level of observational learning can be considerably enhanced through practice or overt rehearsal of modeled response sequences, particularly if the rehearsal is interposed after natural segments of a larger modeled pattern...Like coding, rehearsal involves active processes. There is reason to believe that the benefits accruing from rehearsal results from an individual's reorganization and recoding of input events rather than from sheer repetition.
(pp. 21-22)

Research on the effects of rehearsal has produced somewhat inconsistent findings, however. For instance, in two studies of altruistic behavior (donating to a charity) among fourth and fifth graders

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3 The two may be distinguished on the basis of whether the summary label is descriptive (e.g., "make alternate right and left turns") or symbolic (e.g., RLRLRL). The former is a "rule" and the latter a "code."
(Rosenhan & White, 1967; White, 1972), it was found that modeling alone did not suffice to elicit the desired response; in contrast, subjects who had the additional opportunity to rehearse donating subsequently exhibited this behavior. In another investigation using college students, Bandura and Jeffery (1973) report that subjects who coded the model's actions and immediately rehearsed these codes attained the highest level of retention, although coding alone or rehearsal without coding did not improve recall.

On the other hand, Rosenthal and Zimmerman (1973) found that modeling plus practice subjects (third and fifth graders) did not perform any better than modeling only subjects on a dial-reading concept measure. The same results were obtained in a different experiment using third grade children and a word selection task (Rosenthal & White, 1972). Indeed, two studies report that rehearsal actually resulted in decreased observational learning among children subjects. The first (Williams & Willoughby, 1971) involved performance on a paired-associate task, and the second (Zimmerman & Bell, 1972) entailed the vicarious learning of a conceptual rule.

Taken together, the evidence suggests that rehearsal operations interposed during modeling may or may not augment matching performance, depending on at least four factors--the type of skill being portrayed, the manner in which practice is being made, whether summary rules or codes are also provided, and the latency of the response measure. With respect to the last point, for example, it has been suggested that rehearsal exerts greatest influence when imitative behavior is tested immediately after modeling (Bandura, Jeffery, & Bachicha, 1974). Also,
verbal and nonverbal forms of practice may produce differential effects (Friedman, 1972), as might overt versus covert rehearsal. In any event, it is fairly clear that rehearsal would have detrimental effects on acquisition if it interferes with the effective organization of information being modeled. Further research is needed to clarify these issues.

4. The influence of reinforcement.

(a) Vicarious reinforcement.

Studies which experimentally varied the type of consequences to the model have generally found that vicarious reward leads to greater imitation by the observer. For instance, Liebert and Fernandez (1970a) report that rewarding the model for making commodity preferences produced greater spontaneous imitation by 6 and 7 year old girls than when subjects witnessed the model perform without reward. Cheyne (1971) likewise found that vicarious reward to a peer model facilitated both the performance and recall of the depicted choice behavior by third graders. Similar findings have been obtained in other studies with lower elementary children (e.g., Levy, McClinton, Rabinowitz, & Wolkin, 1974; Oliver & Hoppe, 1974; Thelen, McGuire, Simmonds, & Akamatsu, 1974). However, conflicting data have also been reported. Thelen, Rennie, Fryrear, & McGuire (1972), for example, found that vicarious reward alone did not increase spontaneous imitation of the model's button-pressing behavior by first, second, and third graders, although coupling positive consequences to the model with an expectancy for the subject to perform did heighten imitative behavior. Dubner (1973) also found no facilitative effects from rewarding the model.

As for vicarious punishment, a survey of the literature (Thelen
Rennie, 1972) reveals that findings are much less equivocal. In most all studies employing this manipulation, imitative tendencies by observers were suppressed (e.g., Cheyne, 1971; Levy et al., 1974; Liebert & Fernandez, 1970a). Only one investigation (Peed & Forehand, 1973) failed to find a deterring effect of punishing the model on subjects' matching performance. These researchers also found that vicarious reward did not increase imitation, although rewarding the model did serve to facilitate subjects' recall of the modeled behavior (commodity preferences).

It appears that the influence of vicarious consequences may be a function of the subject's perception of the situation in which imitation is to be displayed. In other words, a child would be more likely to produce a matching performance after seeing the model rewarded if he expects to likewise receive a positive outcome, and vice versa. However, if this expectation is absent, then the effects of vicarious reinforcement will probably be obscured. Moreover, the ability to form such an expectancy may vary directly with developmental staging; this could partially account for the negative finding by Peed and Forehand (1973), mentioned earlier, as their subjects were only of preschool age.

(b) Direct positive reinforcement. No study was found in which subjects were directly punished for imitation (see p. 30 for selection criteria of studies reviewed in this chapter).
discussed with respect to vicarious reward. In one experiment, the investigators (Zimmerman & Pike, 1972) found that second grade children who were exposed to a model and praised for matching behavior (question-formulation) subsequently displayed more imitation than subjects who received only praise. The former group also evidenced a higher degree of generalization to a set of unfamiliar stimulus cards. In another study (Liebert & Fernandez, 1970b), the results indicated that 4 to 6 year old subjects increased their matching responses when they were rewarded for imitation; subjects also displayed greater imitation when the model was reinforced, with the strongest performance by those who received both vicarious and direct reward. Similarly, Whitehurst and Novak (1973) report that preschool subjects who underwent modeling and direct reward reproduced a greater number of the modeled phrase type than those who were exposed only to modeling.

The effects of direct positive reinforcement on imitation do not appear to be uniform, however. For instance, Odom, Liebert, and Hill (1968) found that although second graders reproduced ungrammatical phrases during acquisition after being rewarded, they did not emit this type of sentence construction after the training. Along similar lines, Steinman and Boyce (1971) report that their subjects (5½ year old girls) exhibited a reinforcement effect on choice trials following modeling, but not on single presentation trials (involving the imitation of various motor behaviors). Hence, rewarding subjects for matching behavior does not always result in greater subsequent imitation. It is likely that certain cognitive variables are also at work determining whether and to what extent a given matching response would be repeated.
Two experiments have studied the effects of an expectancy of direct reward on imitative behavior (Rosenthal & Carroll, 1972; Rosenthal & Zimmerman, 1972). In the first, seventh graders were offered a substantial incentive ($20 for a group party) contingent on matching performance, and in the second, third grade children received a favorable outcome expectation (the experimenter said he was sure the subject would do a great job). Both studies failed to find an effect of reward expectancy—subjects who anticipated no outcome performed equally well. It might be questioned, however, whether the above manipulations constituted a fair test of the concept. In the former case, the incentive was group-rather than individually-directed, and its credibility may also have been in doubt. In the latter case, it was unlikely that the experimenter's exhortation went very far in implanting an anticipation of favorable outcome in subjects. These findings should hence be regarded as tenuous.

In sum, the research on modeling and related phenomena has yielded a large array of findings, pertaining to a fair number of topic areas. Within each area, the data are often consistent, but sometimes also contradictory. In many instances, comparison of the results from various studies is hazardous inasmuch as the populations studied, procedures involved, and dependent measures employed were all quite diverse. Future research could profitably address some of the empirical issues outlined earlier, as well as attempt to reconcile the theoretical divergences which exist concerning observational learning in children.

The studies surveyed in the preceding pages have evidenced a variety of interesting variables. These include, among others, rule
provision, rehearsal, reward expectancy, as well as the efficacy of modeling itself. They have also generated a host of exciting research possibilities, such as: does age, sex, and intelligence covary with imitation of basic skills? How might modeling be incorporated into a classroom-oriented training regimen? What effects do different training procedures have in children's acquisition and transfer of school-related competencies? To what extent do training effects persist over time? And so on. These were some of the questions that were considered and operationalized as part of the research design in the present study.
CHAPTER IV
THE STUDY

Details of the present investigation are described in this chapter.

Setting

The setting of this study was the Kamehameha Early Education Program (KEEP), a research and demonstration school initiated in 1971 under the auspices of the Kamehameha Schools/Bernice P. Bishop Estate. The goals of KEEP are to develop solutions to educational problems facing children of part-Hawaiian ancestry, and to disseminate its findings to the larger educational community. During the academic year 1974-75, three classes were in progress at KEEP--kindergarten, first, and second grades--with 28 children in each. The curricula and instructional organization at KEEP match those in operation within Hawaii's public schools, as specified by the State Department of Education. In addition, the teachers and staff at KEEP engage in extensive research and consultation activities, including teacher training, curriculum development, and child studies, designed to discover and share better methods of enhancing the education of part-Hawaiian children.

At the time of the study, the KEEP school was housed within a spacious one-story building which provided room for two large instructional areas, a multi-purpose room, a cafeteria, and an observation theater with one-way mirrors overseeing both instructional areas as well as the multi-purpose room. An adjacent building provided office
space for the KEEP staff, which numbered 23 individuals. 6 A third building on the grounds contained experimental rooms for research and storage use.

First and second graders at KEEP shared the same instructional area and were either in a 3 on 2 situation or segregated by grade. The kindergarteners were in a self-contained classroom. Teaching responsibilities for the first and second grades were shared by six educational specialists (ESs), while the kindergarten was maintained by two other ESs.

The study ran for a duration of eight weeks, from January 13 through March 7, 1975. This represented the beginning portion of the second half of the 1974-75 academic year at KEEP.

Subjects

48 KEEP pupils served as subjects (Ss) in the experiment--24 kindergarteners and 24 first graders, with approximate mean ages of 6 and 7 years respectively. There were 25 boys and 23 girls, and 78% of the subjects were of part-Hawaiian ancestry. 7 Overall, their demographic characteristics were representative of the average kindergarten and first grade public school classrooms in Kalihi, a low income area of greater Honolulu (Mays, Boggs, Tharp, & Gallimore, 1974).

6These consisted of two principal investigators, a program coordinator, a coordinator of teacher training and consultation, eight educational specialists (teacher-researchers), two linguists, a media specialist, a school/family liaison worker, four research assistants, a research clerk, a secretary, and a custodian.

7Ethnicity data were unavailable for two subjects. The percentage above was computed on the basis of 36 part-Hawaiians out of 46 pupils. A child with any amount of Hawaiian ancestry was classified as part-Hawaiian. There were no full Hawaiians in the two grades.
Experimenters and Observers

Seven individuals participated in the implementation of the study: a trainer (T), a special (non-KEEP) teacher (ST), and five observers (Os). T was male, Chinese, and in his mid-twenties. ST was female, Chinese, in her late twenties, and a doctoral candidate in education with previous teaching experience. Four of the five Os were undergraduate psychology majors at the University of Hawaii, and the fifth was a graduate student in anthropology. All Os were given research credit for their participation.

Apparatus

The materials employed in the present research included various instructional supplies (cuisenaire rods, worksheets), furniture (low tables, pupil's chairs), and videotape equipment. The latter consisted of cartridge tapes; a recorder and player; a camera; a video monitor; microphones; and assorted electrical hardware. In addition, a collection of 1½" X 2" picture ("Kikaida") cards served as reward tokens for the subjects.

Manipulations and Hypotheses

The first manipulation in the study involved the isolation of four distinct training procedures, one of which was a control. All training was conducted by means of videotape in which ST enacted the role of teacher with eight KEEP second graders as pupils. The classroom (small group) setting depicted in every film resembled that where-in all Ss would subsequently be tested for generalization following training. Each training condition is briefly described below:
1. Instructions Condition (I): here, ST described the particular classroom situation in question, then verbalized the set of behaviors which should be performed in this situation as well as those behaviors which should not be performed. This condition represented a quasi-control which approximated the type of instructional strategy used by most teachers in the actual classroom setting.

2. Instructions plus Modeling Condition (IM): in this condition, ST verbalized the situation and behaviors as in I, but additionally requested two pupils (one boy and one girl) to model each target behavior on the tape. Hence, Ss heard the target responses from ST and saw each response demonstrated twice, once by a same-sex peer and once by an opposite-sex peer. This condition assessed whether modeling was a facilitative factor in inducing both acquisition and transfer from training.

3. Instructions plus Modeling plus Rehearsal Condition (IMR): here, Ss viewed the identical training film as that shown in IM, with the added provision that Ss also rehearsed each appropriate target response after seeing the peer models enact it (no rehearsal of inappropriate responses). The trainer (T) stopped the film at suitable points and ensured that S displayed the behavior correctly. This condition was designed to test whether augmenting modeling with behavioral rehearsal would result in greater observational learning and generalization.

4. Placebo Control Condition (C): Ss in this condition likewise viewed a film showing ST and eight second graders, but the content of the
film (a story) was unrelated to the target behaviors of interest. This condition was introduced to control for possible effects resulting from S exposure to a film and to T.

The second manipulation in the study involved the variable of reward expectancy. Half of the Ss in each training condition were told (following the training) that they would receive three picture cards if they performed the desired behaviors in class, while the remaining half received no expectation of reward.

The two major hypotheses in this investigation were:
1. Ss in IMR would display the highest level of appropriate skill performance during generalization, followed by Ss in IM, I, and C, respectively.

2. Ss receiving an expectancy of reward (not including control Ss) would exhibit more appropriate target responses during generalization than Ss who received no expectation.

Target Situation and Behaviors

The target situation in the present research was working in a small group in the classroom. Each group consisted of eight pupils and a teacher who assigned the task(s) and monitored the pupils. The duration of this situation was 15 minutes on the average. This type of small group work was characteristic of a great deal of the actual instruction taking place at KEEP both before and after the implementation of the study.

The behaviors of interest fell within three general classes: deportment skills, information-processing skills, and help-seeking
skills. The consensus among teachers was that these were important behaviors for any pupil to learn and manifest to the extent that they facilitated his learning in the structured classroom setting. Specific responses within each class were as follows: 8

Deportment skills --staying in one's chair;
attending to the teacher when she spoke;
working on one's task nondisruptively;
being silent when the teacher spoke.

Information-processing skills--answering questions posed by the teacher;
carrying out teacher directions.

Help-seeking skills --when unable to work further, raising one's hand, waiting quietly for recognition, and asking for help or to have one's work checked.

The above, together with their inappropriate counterparts, constituted the target behaviors in the study. The desired skills were responses which all or nearly all of the KEEP pupils already possessed in their repertoire, although the degree and timing of their manifestation prior to the study were inadequate or inappropriate. In essence, then, the training did not involve Ss having to learn anything new. Also, recognizing the difficulty of effecting generalization (from training to actual situation) in young children, the present study selected relatively minimal target behaviors, in terms of exertion

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8Detailed definitions of each are given in the Appendix.
required, and ensured that they were of a fairly small number (so as not to overwhelm the Ss).

Procedure

1. General experimental plan.

Prior to the onset of the study, five observers (Os) were recruited and trained. Pilot-testing of the instruments and procedures was also conducted during this period, using KEEP second graders as subjects. The study then commenced with first grade Ss, who underwent a pre-training baseline phase, training, retraining, and a follow-up phase. The identical schedule was next replicated with kindergarten Ss.

Training and retraining were conducted individually with each S, who was randomly assigned to treatment condition. There were eight treatment conditions during training, corresponding to the 4 X 2 (training by reward) design of the study. However, during retraining, there were only two treatment conditions; these represented the two methods that evidently were most effective following the training. The rationale behind the retraining was primarily to afford all Ss with the opportunity to benefit from whatever efficacy the study's procedures may have had, so that they could subsequently use the skills to their own best advantage.

Acquisition data on Ss were gathered immediately following the training and retraining, and performance data were collected in the classroom situation during each of the four phases of the study. Each

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9 For first graders, these were IMR plus reward and I plus reward; for kindergarteners, IMR plus reward and IM plus reward.
phase lasted one week, resulting in the experiment running for a duration of four weeks with the first graders and four weeks with the kindergarteners, or a total of eight weeks.

2. Design considerations.

The present investigation employed a 4 X 2 fixed factor design, representing the four training methods and two levels of the expectancy of reward variable. In addition, repeated measures of performance were taken on all Ss at four intervals--pre-training, post-training, post-retraining and follow-up. In order to equate treatment groups, Ss were stratified into high and low performance groupings (ratio of appropriate to inappropriate target behaviors) on the basis of their pre-training scores, and within each block Ss were randomly assigned to treatment condition. Also, to neutralize discrepancies in the learning of the training content, Ss were informed of the correct answer during the acquisition test if they emitted the wrong (or no) response. This helped to ensure that Ss across treatment conditions came away from the training with at least a near-perfect grasp of what had just been imparted to them. Understandably, the above procedures could have militated against the discovery of significant differences among treatment groups. However, by the same token, any behavioral generalization differences that were observed in the classroom after the training could be attributed more confidently to specific variations in the training regimen, to the extent that the influence of extraneous factors such as sampling error and acquisitional variance had been minimized.

Furthermore, it was critical that Ss in different conditions were exposed to an identical or near-identical stimulus situation in
the classroom during the times they were monitored; otherwise, group
differences may have been a function of divergent stimulus exposures
rather than different training formats. In addition, to maximize the
possibility of observing differential generalization, it was necessary
to monitor Ss as soon after the training as possible. Taking these
factors into account, the following procedure was adopted:

Prior to the pre-training baseline, Ss were randomly assigned
to membership in a small group. Each small group consisted of eight
Ss and its membership remained constant throughout the duration of the
study. Of these eight, two were in each training condition, and within
condition, one was to receive an expectation of reward and the other no
expectation. In other words, each 8-member group represented a distinct
4 X 2 unit corresponding to the study's design. Also, all 8 Ss were
pupils from the same grade. At the first baseline, Ss were monitored\(^{10}\)
for two 15-minute periods working with their small group peers. Then,
during training, on a given day all 8 Ss belonging to the same small
group were trained individually between 8 and 11 a.m., with the order
of treatment condition randomly varied. These 8 Ss were then monitored
in a small group situation from approximately 11:15 to 11:30 a.m., and
again for a quarter-hour period the same afternoon. On the following
day, the next small group of 8 Ss were trained and monitored under the
same rubric as before, and so on. At the end of the week, this resulted
in one training session and two performance periods for each subject in
the same grade, following which retraining commenced, lasting for

\(^{10}\) "Monitoring" involved videotaping the entire performance
session; from these tapes, observers subsequently scored Ss on the
target behaviors.
another week wherein each subject was retrained in one session and monitored twice (same morning and afternoon). In the ensuing follow-up, no training was conducted but Ss were once again monitored for two sessions. This scheduling applied to both first grade and kindergarten Ss.

By this procedure, Ss were tested for short-term and longer-term generalization effects. Also, by structuring the type of 8-member groupings as described above, it was ensured that Ss across conditions were equated in the stimulus exposure dimension to the extent that each 8-member group was in an identical academic setting during the performance test.

3. Training procedure details.

Each training session lasted approximately 15 minutes and took place in an area\textsuperscript{11} segregated from the regular KEEP classrooms, thus permitting some degree of privacy. The area contained a low table, chairs, training materials and tapes, and a videotape player and monitor (TV screen). Before each session, the trainer (I) arranged the equipment properly and then went to the classroom to call for the designated S. I brought S back to the training area and said to him: "Okay, let's come inside, you sit down here (pointing to chair) and I'll sit here. Ready? We're going to watch a movie. I want you to pay close attention to what goes on in the movie (pointing to monitor), because I'll be asking you some questions about it later, okay?" At

\textsuperscript{11}For kindergarten Ss, this was an experimental room located in the research building. For first grade Ss, however, training was conducted in the cafeteria as construction on the research building was not yet completed at that time.
this juncture I turned on the player and the (black and white) film came on the screen.

The respective training films had the following scripts:

1. Instructions Condition (I): the film showed ST with eight second graders, four boys and four girls. The pupils were seated around a large work table with cuisenaire rods\textsuperscript{12} in front of them, and ST also sat at the table, facing the camera. ST began by saying: "I'm going to talk to you about working in a small group in class. Small group means there are eight boys and girls working together at the same table, just like now. I'm going to go over all the things you should be doing during small group work, and all the things you should not be doing, okay? Listen carefully. First, you SHOULD stay in your chair for the whole time you're in a small group. You should NOT get out of your chair. Next, you SHOULD look at the teacher when she's talking. So when the teacher is talking, you should NOT look at somebody else or around the room. Also, when you're working in a small group, you SHOULD only use your own materials, the ones in front of you. You should NOT use other children's materials. And when the teacher is talking, you SHOULD be quiet. You should NOT speak when the teacher is talking. Okay. The lesson is almost done. I'm going to tell you a few more things you should and should not do during small group work in class. When the teacher asks you a question, you SHOULD answer her. So, you should NOT just say nothing when the teacher is asking you something.\textsuperscript{12}These came in different lengths and colors and were customarily used as a teaching aid in mathematics lessons.
Next, when the teacher tells you to do something, you **SHOULD** do it. When the teacher tells you to do something, you **should NOT** start doing something else or just do nothing. Okay, one last thing. After you work on your assignment, when you cannot go any further, you **SHOULD** raise your hand, wait quietly in your seat till the teacher sees you, and then ask her for help or to check your work. So when you cannot work any more, you **should NOT** just do nothing or call out for the teacher. Very good. Now, so that you'll remember what you should do during small group work, I'm going to go over the lesson once more. Pay close attention! **ST** then reviewed the entire set of appropriate (only) target behaviors, verbalizing them in the same way as before. After this, the film ended.

At this point, **I** turned off the videotape player and proceeded to test **S** on his acquisition—recording the number of correct responses—by posing questions relating to the seven skill areas and requiring **S** to answer verbally.\(^\text{13}\)

2. **Instructions plus Modeling Condition (IM):** again, the film showed **ST** and eight second graders in a small group situation as in I. **ST** began by saying: "I'm going to talk to you about working in a small group in class. Small group means there are eight boys and girls working together at the same table, just like now. I'm going to go over all the things you should be doing during small group work, and all the things you should not be doing, okay? Listen

\(^\text{13}\) A list of the seven questions is provided in the Appendix.
carefully. First, you SHOULD stay in your chair for the whole time you're in a small group. (Turning to girl model) Johnette, show us what staying in your chair means." The camera then zoomed in on the model (in the foreground of the film) who demonstrated the behavior. When Johnette finished, ST said: "Okay. (Turning to boy model) Abraham, show us what staying in your chair means." Again, the camera zoomed in on the model (also in foreground) who displayed the response. ST continued: "You should NOT get out of your chair. (Turning to Johnette) Johnette, show us what getting out of your chair means." Once more, the camera zoomed in on the model who demonstrated the response. ST then said: "Okay. (Turning to Abraham) Abraham, show us what getting out of your chair means." The camera again zoomed in on the model exhibiting the behavior. The film continued with ST going over the remaining target behaviors exactly as in I, with the added component that the same two pupils modeled each (appropriate and inappropriate) response immediately after ST described it verbally and requested its demonstration (camera zooming in on all modeling sequences). After the last target behavior was described and modeled, ST, as before, reviewed the entire set of desired target responses and the film ended.

I then turned off the player and tested S's acquisition by asking him questions about each skill area covered in the film and requiring him to answer verbally. Again, number of correct responses was noted.
3. Instructions plus Modeling plus Rehearsal Condition (IMR): Ss in this condition viewed the identical film as that used in IM. The additional element entailed S rehearsing each appropriate target behavior (no rehearsal of inappropriate behaviors). This was accomplished by T turning off the videotape player after the peer models had demonstrated the first desired response, ensuring that S himself displayed the behavior (e.g., "Can you show me what staying in your chair means?"), turning on the player again until the next desired response was modeled, and so on. Behavioral rehearsal on S's part was hence interposed at suitable segments of the film.\textsuperscript{14} When the training film ended, T again tested S on his acquisition in the same manner as before and recorded the number of correct responses.

4. Placebo Control Condition (C): here, Ss also watched a film with ST and eight second graders present. However, there was no mention of appropriate or inappropriate behaviors. The film showed ST reading and later reviewing a story about Robin Hood to the pupils, and lasted for approximately the same duration as the other training films. Afterwards, T asked S a predetermined set of questions\textsuperscript{15} about the story in the film and recorded the number of correct responses as an indirect check on S's attention to the film. This

\textsuperscript{14}To avoid introducing a confounding variable during the training, no reinforcement was given to either the peer models for demonstrating the responses or S for practicing them, except for saying "okay" and "mm-hm."

\textsuperscript{15}Also in the Appendix.
latter procedure was designed to resemble the acquisition testing conducted with Ss in the experimental conditions.

Following the acquisition test, T said to all experimental (I, IM, IMR) Ss: "Now I really want you to remember what you've learned here just now, okay? Really remember it, and I want you to do what you should do when you go back to class. I know you can. Every time you work in a small group, do what you've learned here. And I don't want you to do what you should not do. Okay? Just do the good things you should do when you work in a small group in class."

For control (C) Ss, after the questions about the story, T said: "Now I really want you to remember what you've learned here just now, okay? Really remember the story when you go back to class. I might ask you more questions about it later."

This concluded the training session for Ss in the no-reward expectancy condition. For Ss who were to be given an expectation of reward, T added: "And if you do as I say, I'll give you three of these later." T pulled a stack of Kikaida cards 16 out of his pocket and showed them to S, continuing: "If you do the good things you've learned here just now back in small group work in class, I'll give you three Kikaida cards later on, okay? But you have to be a good boy (girl) to get them, okay?" At the end of the session, T sent S back to

16These were similar to baseball cards and depicted various heroes and villains in the Kikaida television series. They were highly desirable commodities among the KEEP children, and were also relatively inexpensive.
the classroom, rearranged the materials in the training area as needed, and then went to fetch the next S.

Thus, the training manipulation consisted of four distinct procedures which had commonalities in their scripts but were substantially different in focus. In C, Ss were exposed to a story being told in a small group setting, with ST and eight peers present; in I, Ss heard a verbal presentation on desired and undesired behaviors during small group work; Ss in IMR received the additional training of viewing peer models demonstrate the target behaviors as well as rehearsed the desired responses themselves; and Ss in IM were exposed to instructions and modeling but did not themselves engage in rehearsal.

The training was designed so that Ss in all treatment conditions were exposed to a film which depicted the same actors in a small group situation, heard ST go over and review the key features of a particular presentation, were themselves tested on these features, and were given a verbal prompt to transfer their learning to the classroom. In addition, Ss in the reward condition were given an incentive or expectancy of reinforcement for subsequent appropriate performance. The rationale for incorporating all these elements into the training was to increase the likelihood that successful transfer would result.

During the retraining period, Ss were randomly placed in one of the two most effective treatment conditions and underwent the identical procedure as previously described. The picture cards were given to all Ss after the retraining phase.

4. Classroom setting details.

Pre-training baseline was taken on all Ss during small group
work in their regular class schedules. Each S was observed for two quarter-hour periods at the end of which his target behavioral frequencies were summed, and his ratio of appropriate to inappropriate responses computed. On the basis of these ratios, Ss were stratified into high and low performance groupings and within each block they were randomly assigned to the eight treatment combinations.

All subsequent monitoring of Ss (post-training, post-retraining, and follow-up) were done in two settings, both involving small group work. The first (11:15—11:30 a.m.) entailed S working in a small group of eight with one of the KEEP educational specialists (ESs) in charge. As discussed earlier, membership in this group was predetermined and consisted of the same eight Ss who were trained or retrained earlier that morning, or, in the phase of follow-up, retrained the week before. The ES in charge was instructed by T beforehand to ensure that this small group was seated at the same table, and not to provide special attention to any particular pupil in the group. Otherwise, the ES gave directions and carried out content instruction in the same manner as what regularly occurred during small group work. The nature of the task(s) to be performed by Ss during this session was also left up to the discretion of the ES (e.g., arithmetic, writing, social studies).

The second setting to be monitored (a 15-minute period in the afternoon) entailed S working with the same small group under the guidance of ST, who was the teacher in the training films. This lesson took place in the location where all Ss had received their training, and the content of instructions was held constant across all Ss. The task involved Ss manipulating cuisenaire rods to form various colors,
shapes and alphabets as directed by ST. As with the ES, ST was instructed by T to keep stimulus properties constant for all Ss by not interacting with any S disproportionately, and by giving directions and praises to either the group as a whole or every S on an individual basis. At the beginning of the first day's session, ST said to the pupils:

"Hi. My name is Mrs. and I'm going to be your teacher for this class. Since we don't know each other, I would like to go around the table and ask each one of you to tell me your name. I'll start with you (nodding to the S closest to ST). What's your name? (S gave response and ST repeated procedure for all Ss) Very good. Today we're going to play some games with cuisenaire rods (took out rods). I'll give each of you a box of rods (distributed to Ss). Okay, will each of you open your box and take some of the rods out as I'm doing? Now everybody listen carefully. First, I want you to make a ......"

The lesson proceeded with ST giving a specific direction, Ss working, Ss asking questions or requesting to have their work checked, ST giving a new direction, and so on. In general, ST used disciplinary measures only if the entire group became disorderly, without disciplining any S individually. At the end of about 15 minutes, the lesson was terminated.

On the next two occasions when the same group met with ST (after retraining and at follow-up), the latter essentially repeated the above presentation with small alterations in language, geared to her greater familiarity with Ss by then. This procedure was replicated
for all 8-member groups of Ss.

Table 2 illustrates the total routine undergone by each S
(See Table 2).

Table 2
Subject Activities Corresponding to Study Phase

<table>
<thead>
<tr>
<th>Activity</th>
<th>Study Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) unobtrusively observed for two</td>
<td>pre-training</td>
</tr>
<tr>
<td>15-minute sessions in a small group</td>
<td>baseline</td>
</tr>
<tr>
<td>(b) a 15-minute training session with I</td>
<td>training</td>
</tr>
<tr>
<td>(c) a 15-minute small group session with</td>
<td>post-training</td>
</tr>
<tr>
<td>the ES (morning)</td>
<td></td>
</tr>
<tr>
<td>(d) a 15-minute small group session with</td>
<td>post-training</td>
</tr>
<tr>
<td>ST (afternoon)</td>
<td></td>
</tr>
<tr>
<td>(e) a 15-minute retraining session with I</td>
<td>retraining</td>
</tr>
<tr>
<td>(f) a repeat of (c) above</td>
<td>post-retraining</td>
</tr>
<tr>
<td>(g) a repeat of (d) above</td>
<td>post-retraining</td>
</tr>
<tr>
<td>(h) a repeat of (c) above</td>
<td>follow-up</td>
</tr>
<tr>
<td>(i) a repeat of (d) above</td>
<td>follow-up</td>
</tr>
</tbody>
</table>
The small group session with the ES represented the conventional classroom small group situation, and the session with ST represented yet another, perhaps more structured academic situation using the small group format. The sessions were organized so that the former held the external stimuli constant at least within each small group, while the latter attempted to hold such stimuli constant across all groups. Both the ES and ST were blind to each S's treatment condition.

5. Observation logistics.

Five observers (Os) were recruited and trained for the major data collection task of the study. The training involved T describing to Os the observational system, definitions of each target behavior, and the specific methodology of recording each response. Trial applications were held using existing KEEP videotapes of small groups, and finally reliability was established between T and each O, as well as among Os themselves. The criterion reliability coefficient was set at .80; this was exceeded by all pairs of observers at the end of the observation training.

As mentioned earlier, there were three classes of target subject behaviors. Specific behavioral definitions of each follow:17

Deportment skills:

sitting appropriately -- S remained in his own chair;

17 More detailed descriptions of the target behaviors are given in the Appendix.
<table>
<thead>
<tr>
<th>Behavior</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>attending to teacher</td>
<td>$S$ watched the teacher while the latter was speaking to $S$ or to the group as a whole;</td>
</tr>
<tr>
<td>working on task</td>
<td>$S$ used his own materials in working on his task(s) without handling other $S$'s materials;</td>
</tr>
<tr>
<td>being silent</td>
<td>$S$ did not speak out of turn when the teacher was speaking to $S$ or to the group.</td>
</tr>
<tr>
<td>Information-processing skills:</td>
<td></td>
</tr>
<tr>
<td>answering teacher's</td>
<td>$S$ answered verbally a question posed to him by the teacher;</td>
</tr>
<tr>
<td>questions</td>
<td></td>
</tr>
<tr>
<td>following teacher's</td>
<td>$S$ responded appropriately to a specific direction given by the teacher.</td>
</tr>
<tr>
<td>directions</td>
<td></td>
</tr>
<tr>
<td>Help-seeking skills:</td>
<td></td>
</tr>
<tr>
<td>raising hand</td>
<td>when $S$ could not work further (either stuck or completed the task), $S$ raised his hand, waited quietly for the teacher to come or recognize him, and asked for help or to have his work checked.</td>
</tr>
</tbody>
</table>

In addition, undesired counterparts to each of the above behaviors were described during the training. These were, respectively:
getting out of chair -- 5 left his seat at any time during the session;

not attending to teacher -- 5 watched another pupil or looked around the room while the teacher was talking;

using other's materials -- 5 handled another pupil's materials during the small group work;

speaking out of turn -- 5 spoke after the teacher had started speaking;

not answering questions -- 5 did not respond verbally when the teacher asked him a question;

not following directions -- 5 did nothing or responded inappropriately to a direction given him by the teacher;

not raising hand/calling out -- when 5 could work no further, 5 went up to the teacher or called out for the teacher.

In terms of the desired target behaviors just listed, it was of additional interest to note whether peer interactions served to interfere with their manifestation. Three other observers (Ps) undertook to record such patterns by monitoring a group of 8 first grade Ss through the four phases of the study, thus supplying supplemental
information. These Ps constructed transcripts of all discernable peer interactions (from videotapes) on the basis of which the data were content analyzed.

For the Os who focused on the target behaviors in the study, at every observation period, each O was randomly assigned two Ss who were to be his observees during that period.\(^{18}\) The four Os observed independently of and concurrently with one another. All observations were made off videotapes, with the small group sessions (two a day) being recorded beforehand. The observations were done every Sunday during the experiment, with the training (or retraining) and small group sessions conducted for three days in the previous week. This obviated the necessity for Os to be actually present when the small group work was held, which was inconvenient for them. Hence, in any given week, the entire observation session consisted of six observation periods, corresponding to the six small group sessions that were pre-taped, and lasted for approximately two hours, including a break in between. To control for possible order effects in the observations, tapes were presented to Os in a randomized sequence.

Each observation period was divided into three 5-minute intervals for each of which O used one observation sheet.\(^{19}\) I accompanied Os in all observations and acted as a pacer, calling out the beginning

\(^{18}\) Since there were five Os, one sat out during each period, with the other four observing. Alternating the O sitting out allowed occasional respites for each, which facilitated observation ease. Recruiting five Os, when only four were needed, was also a helpful safety measure in the event a given O was absent, which occurred twice.

\(^{19}\) A sample observation sheet may be found in the Appendix.
of each interval. On their part, Os recorded frequency counts of the target behaviors on each sheet as exhibited by their particular two observees. Exceptions were the two behaviors of 'sitting appropriately' and 'working on task' (marked with an 'X' on the sheet) for which Os did not take frequency counts but simply checked (or not checked) at the beginning of each interval. I also announced the termination of the observation period. In addition to the behavior counts, Os recorded the two S's names on each sheet, the interval, their own name, and whether the small group session was in the morning or afternoon. When I collected the completed sheets from Os, he also recorded the date of the small group session (blind to Os). Blank sheets were then distributed to Os for the next observation period. All Os were blind to S's' treatment conditions, as well as to the hypotheses in the study.

The above observation procedure was relatively easy to implement and generated a fair amount of information of the frequencies with which Ss performed each of the target behaviors. Breaking down the observation period into 5-minute segments allowed one to ascertain whether there were changes in S's' behaviors as the small group session progressed.

Sources of Data

In sum, the present research employed the following dependent measures:

1. The primary source of data was the behavioral frequencies as recorded by Os. Such data provided information on the extent to which Ss generalized from their training (or retraining) to the
classroom setting. Inappropriate as well as appropriate responses were noted.

2. Another important measure was the number of correct responses emitted by Ss during the acquisition test. This assessed the degree to which Ss actually learned the training content.

3. Data on peer interaction patterns, although these were not collected on all Ss and were not readily quantifiable, offered some indication of the nature and extent of peer interference during the small group sessions. Such information would also be useful in the event transfer did not occur after training.

4. Additional data sources which were available included Ss' verbal, performance, and full scale (WPPSI) IQs, percentile scores on the Metropolitan Readiness Test, and other demographic information such as their ethnicity, sex, and the socio-economic status of their parents.
CHAPTER V
Results

Observer Reliability

The training of observers lasted approximately one week during which all 5 Os and 1 scored selected videotapes (5-minute segments) of small group sessions. In this phase, details of the observation system were worked out and difficulties resolved. At the end of the week, a total of twenty trial observations had been held. For the final session, observer reliability coefficients were computed using the method proposed by Bijou, Peterson, and Ault (1968), where reliability = no. of agreements/no. of agreements + no. of disagreements. Resultant reliabilities between all pairs of observers are presented in Table 3.

Table 3
Observer Reliabilities Following Observation Training

<table>
<thead>
<tr>
<th></th>
<th>01</th>
<th>02</th>
<th>03</th>
<th>04</th>
<th>05</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>.9546</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>02</td>
<td></td>
<td>.8636</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>03</td>
<td></td>
<td></td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>04</td>
<td></td>
<td></td>
<td></td>
<td>1.0000</td>
<td></td>
</tr>
<tr>
<td>05</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.0000</td>
</tr>
</tbody>
</table>
As can be seen, all coefficients exceeded the criterion reliability which had been set at .8000.

Reliabilities were computed once again approximately two months later, at the completion of the entire study, to ascertain whether Os were still in substantial agreement with one another. Table 4 illustrates this matrix.

Table 4
Observer Reliabilities Following the Study

<table>
<thead>
<tr>
<th></th>
<th>T</th>
<th>01</th>
<th>02</th>
<th>03</th>
<th>04</th>
<th>05</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>---</td>
<td>.9500</td>
<td>.8571</td>
<td>1.0000</td>
<td>.8261</td>
<td>.8571</td>
</tr>
<tr>
<td>01</td>
<td>---</td>
<td>.8095</td>
<td>.9500</td>
<td>.7826</td>
<td>.8095</td>
<td></td>
</tr>
<tr>
<td>02</td>
<td>---</td>
<td>.8571</td>
<td>.7083</td>
<td>.9000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>03</td>
<td>---</td>
<td>.8261</td>
<td>.8571</td>
<td></td>
<td>.7826</td>
<td></td>
</tr>
<tr>
<td>04</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>05</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The coefficients indicate that, for the most part, observer reliabilities continued to be at a high level throughout the study. The total number of experimental sessions scored by each of the five Os ranged from 35 to 40, with a mean of 38.2.

Pre-Training Baseline

Ss' behavior frequencies were summed for this period, separating appropriate responses from inappropriate ones. Inasmuch as Ss were later assigned to one of eight treatment combinations (4 training conditions and 2 reward levels), 1 X 8 analyses of variance
(ANOVA) were run to determine whether there were any pre-training differences among Ss. For appropriate behaviors, $F(7,37) = 0.3162$, $p = .65$; and for inappropriate behaviors, $F(7,37) = 0.0722$, $p = .99$. Newman-Keuls tests (Winer, 1971) on the above two categories of means confirmed that no pre-training differences existed among the S groupings.

**Post-Training**

Analyses of post-training scores were made using 2 x 3 ANOVAs, corresponding to the two levels of the reward expectancy variable and three levels of training condition. The control group was partialed out of these analyses because it was not meaningful to expect the reward variable to have exerted any influence on this group's in-class performance. Control Ss were included in other analyses to be described later.

1. Specific target behaviors.

2 x 3 ANOVAs were run for each target behavior in the study. F ratios which were significant or near-significant are summarized in the next table.
Table 5

Significant or Near-Significant ANOVAs on Specific Role Behaviors

<table>
<thead>
<tr>
<th>Behavior</th>
<th>F (df)</th>
<th>p</th>
<th>Type of Effect*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sitting Appropriately</td>
<td>2.5789 (2,30)</td>
<td>.09</td>
<td>T</td>
</tr>
<tr>
<td>Answering Questions Appropriately</td>
<td>3.0929 (2,30)</td>
<td>.06</td>
<td>T X R</td>
</tr>
<tr>
<td>Not Answering Questions</td>
<td>3.2759 (2,30)</td>
<td>.05</td>
<td>T X R</td>
</tr>
</tbody>
</table>

* T = training main effect; R = reward main effect; T X R = training by reward interaction.

Table 5 indicates that only for the target responses of sitting appropriately and answering or not answering questions were there appreciable treatment effects. For 'sitting appropriately', the Instructions (I) and Instructions plus Modeling (IM) conditions were equal ($\bar{x} = 5.6667$) and superior to the Instructions plus Modeling plus Rehearsal (IMR) condition ($\bar{x} = 5.0833$), although the Newman-Keuls test revealed that this difference was not significant. For 'answering questions', Ss in IM - no reward performed best ($\bar{x} = 3.0000$), followed by those in IMR - reward ($\bar{x} = 2.5000$); Ss in IMR - no reward did least well ($\bar{x} = 1.3333$). For 'not answering questions', all Ss exhibited a zero rate in this response except for those in I - reward ($\bar{x} = 0.5000$) and IMR - no reward ($\bar{x} = 0.3333$); the very low frequency of this behavior was reflected in the Newman-Keuls test which produced no appreciable differences among the groupings.

2. Appropriate behaviors combined.

A 2 X 3 ANOVA on all appropriate role behaviors revealed that
there were no significant main effects (training: $F(2,30) = 0.2441$, $p = .79$; reward: $F(1,30) = 0.1903$, $p = .67$), as well as no significant interaction ($F(2,30) = 2.2188$, $p = .13$). The latter, however, approached significance, and inspection of the means suggests that certain treatment combinations may have been somewhat more effective than others (see Table 6). It might be noted that two of the reasons for the lack of significant effects, despite noticeable differences in means, were the relatively small subject pool and more importantly, the large amount of variation in scores within each treatment condition.

Table 6

<table>
<thead>
<tr>
<th>Treatment Condition</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>IM - no reward</td>
<td>28.3333</td>
<td>10.0609</td>
<td>6</td>
</tr>
<tr>
<td>IMR - reward</td>
<td>28.0000</td>
<td>7.9162</td>
<td>6</td>
</tr>
<tr>
<td>I - no reward</td>
<td>24.1667</td>
<td>8.9892</td>
<td>6</td>
</tr>
<tr>
<td>I - reward</td>
<td>24.1667</td>
<td>4.6696</td>
<td>6</td>
</tr>
<tr>
<td>IM - reward</td>
<td>23.5000</td>
<td>3.9476</td>
<td>6</td>
</tr>
<tr>
<td>IMR - no reward</td>
<td>19.8333</td>
<td>3.1314</td>
<td>6</td>
</tr>
</tbody>
</table>

3. Inappropriate behaviors combined.

Here, the 2 X 3 ANOVA also yielded no significant differences. For training condition, $F(2,30) = 0.0129$, $p = .99$; for reward, $F(1,30) = 0.9237$, $p = .34$; and for training X reward, $F(2,30) = 0.1379$, $p = .87$. A major factor here contributing to the lack of effects was the relatively low rate of inappropriate behaviors by all
experimental Ss during this phase.

4. Analysis by grade.

2 X 3 ANOVAs were run for each subsample of kindergarteners and first graders, separating appropriate from inappropriate behaviors. No significant F ratios were found for the former grade. However, among first grade Ss, a marginally significant training X reward interaction was found in the category of desired target responses (F(2,12) = 3.5757, p = .06). Here, the means fell in approximately the same order as that depicted in Table 6: for first graders, IM - no reward was the most effective treatment combination (\(\bar{x} = 34.0000\)), followed respectively by IMR - reward (\(\bar{x} = 33.3333\)), I - no reward (\(\bar{x} = 28.3333\)), IM - reward (\(\bar{x} = 23.3333\)), I - reward (\(\bar{x} = 21.6667\)), and IMR - no reward (\(\bar{x} = 18.0000\)). Although the Newman-Keuls test showed no reliable differences, a t test\(^{20}\) comparing IMR - reward and IMR - no reward indicated that the former was significantly more efficacious (t(4) = 4.54, p < .05).

5. Analysis by session.

It will be recalled that post-training generalization effects were measured in two sessions, both involving small group work. The former was in the actual classroom setting while the latter was in a simulated classroom whose contextual cues resembled those present during training. 2 X 3 ANOVAs were run specific to each type of session, again keeping separate appropriate and inappropriate target behaviors. It was found that treatment effects were not manifest in

\(^{20}\)All t tests reported in this chapter are two-tailed.
the simulated setting, In contrast, there was a significant main effect of reward in the classroom situation ($F(1,30) = 4.1121, p = .05$). Specifically, Ss who were given an expectancy of reward for desired transfer performed appreciably more appropriate responses than Ss who received no expectancy ($\bar{x}_s = 11.1667$ and $8.7222$ respectively). This suggests that introducing an expectation of reinforcement can have facilitative effects on pupils' skill enactment in the regular class setting, confirming the second hypothesis in this experiment (see Table 7).

Table 7

ANOVA on Appropriate Behaviors in The Classroom Setting Following Training

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training (T)</td>
<td>1.5556</td>
<td>2</td>
<td>0.7778</td>
<td>0.0595</td>
<td>.94</td>
</tr>
<tr>
<td>Reward (R)</td>
<td>53.7778</td>
<td>1</td>
<td>53.7778</td>
<td>4.1121</td>
<td>.05</td>
</tr>
<tr>
<td>T X R</td>
<td>46.2222</td>
<td>2</td>
<td>23.1111</td>
<td>1.7672</td>
<td>.19</td>
</tr>
<tr>
<td>Error</td>
<td>392.3333</td>
<td>30</td>
<td>13.0778</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>493.8889</td>
<td>35</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6. Alternate analyses.

(a) The above ANOVAs were run on Ss' frequencies of appropriate and inappropriate behaviors. In the attempt to account for both desired and undesired responses together, two alternate forms of analysis were attempted: the first entailed computing for each S a difference score (subtracting inappropriate from appropriate behaviors); the second involved calculating a ratio
score for every $S$ (appropriate behaviors divided by inappropriate ones). On the basis of these scores, 2 X 3 ANOVAs were again run.

Generally, the results obtained reflect those reported earlier on simple frequency scores. The ANOVA on $S$ ratios yielded a near-significant training X reward interaction ($F(2,30) = 2.2286, p = .13$), with the IMR - reward condition emerging as most effective ($\bar{x} = 8.4422$) and the IMR - no reward condition having the least impact ($\bar{x} = 2.1298$), these two means being significantly different ($t(10) = 2.10, p = .05$). Moreover, this trend was evident in separate analyses of both kindergarteners and first graders, and using either the difference or the ratio scores. In almost all cases, IMR - reward was the most effective treatment combination, and IMR - no reward the least. Analyzing by session using Ss' difference scores, one again notes the main effect of reward in the regular classroom ($F(1,30) = 3.5201, p = .07$): pupils receiving a reinforcement expectancy outperformed their no-expectancy counterparts ($\bar{x}s = 6.1667$ and 2.6111 respectively).

(b) As the target behavior data might have been distribution-free, non-parametric tests (Walker and Lev, 1953) were run on the category of appropriate behaviors combined. These turned out to be nonsignificant. Comparing the three experimental training conditions, the Kruskal-Wallis $H(2) = 1.007, p > .50$. For the reward variable, the Wilcoxon $T(18) = 71.500, p > .10$. 
Also, no significant interaction was evident (Kruskal-Wallis $H(5) = 6.203, p = .25$).

7. Analysis by training condition only.

For the post-training scores, a 1 X 4 ANOVA was also run to determine whether main effects were present when the control group was included and the reward variable collapsed. Using frequency scores, F ratios for both appropriate and inappropriate target responses were nonsignificant ($F(3,44) = 0.4514, p = .32$; $F(3,44) = 0.1726, p = .52$ respectively). Likewise, ANOVAs done on the basis of difference and ratio scores did not attain significance ($F(3,44) = 0.4553, p = .32$; $F(3,44) = 0.2943, p = .34$ respectively). Hence, the first hypothesis in the study—that IMR Ss would display the highest level of desired performance, followed by IM, I, and C Ss—was not confirmed. However, it might be noted that as expected, control Ss exhibited the least number of desired behaviors, as well as the greatest number of undesired behaviors. They also had lower difference and ratio scores. This is illustrated in Table 8.
Table 8
Means of Target Behavior Measures by Training Condition

<table>
<thead>
<tr>
<th>Measure</th>
<th>C</th>
<th>I</th>
<th>IM</th>
<th>IMR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appropriate Behavior Score</td>
<td>22.5000</td>
<td>24.1667</td>
<td>25.9167</td>
<td>23.9167</td>
</tr>
<tr>
<td>Inappropriate Behavior Score</td>
<td>12.0000</td>
<td>9.7500</td>
<td>10.2500</td>
<td>10.0000</td>
</tr>
<tr>
<td>Difference Score</td>
<td>10.5000</td>
<td>14.4167</td>
<td>15.6667</td>
<td>13.9167</td>
</tr>
<tr>
<td>Ratio Score</td>
<td>3.4725</td>
<td>4.7406</td>
<td>4.4358</td>
<td>5.2860</td>
</tr>
</tbody>
</table>

(n = 12 in each condition)

Post-Retraining and Follow-Up

During the retraining period, Ss in each grade were randomly placed in one of the two treatment combinations which appeared to have greatest efficacy, in terms of both eliciting appropriate classroom behaviors and inhibiting undesired ones. For the kindergarteners, these were IM - reward and IMR - reward. A t test of the difference between these two groups revealed that there were no significant variations in performance of either desired responses (t(20) = 0.26, p = .80) or undesired responses (t(20) = 1.04, p = .31). Similarly, first grade Ss, who were assigned to either I - reward or IMR - reward during retraining, did not show differential transfer for either appropriate behaviors (t(18) = 0.12, p = .91) or inappropriate ones (t(18) = 0.93, p = .37). It appeared then that the retraining treatment conditions were about of equal value.

The same trend of findings was obtained in the phase of follow-up, wherein Ss were given no additional training but were monitored as
before. There was, however, one exception. Among kindergarten Ss, IMR - reward Ss exhibited a significantly higher frequency of appropriate skill performance during follow-up than IM - reward Ss (t(18) = 2.07, p = .05). This suggests that augmenting the training regimen with a rehearsal component could result in longer-term retention than if the practice was absent.

**Acquisition**

A one-way ANOVA was run to determine if there were acquisitional differences among the three experimental training conditions (the reward variable was not yet introduced at the time of the acquisition test). The resultant F ratio approached significance (F(2,33) = 2.3282, p = .11), and inspection of the means indicated that IM Ss learned the training content best (\( \bar{x} = 6.5000 \)), followed by Ss in IMR (\( \bar{x} = 5.9167 \)) and in I (\( \bar{x} = 5.5000 \)), although the Newman-Keuls test was not significant. In this regard it might be pointed out that Ss across conditions evidenced a fairly high rate of acquisition, judging from the above means with a maximum possible score of 7.

There were no learning differences following retraining. Kindergarten Ss acquired the retraining content equally well irrespective of which condition they were placed in (t(20) = .40, p = .70), as did first grade Ss (t(18) = 0.07, p = .95). It is nevertheless encouraging to note that retraining acquisition scores were even higher than those after training, indicating that Ss learned significantly more of the content when they were exposed to it a second time (correlated means t(32) = 2.62, p = .01).
Study Phases

A repeated measures ANOVA was run on the four phases of the study (pre-training, training, retraining, follow-up) to ascertain whether there were progressive changes in experimental (I, IM, IMR) Ss' appropriate as well as inappropriate behaviors. For desired target behaviors, the ANOVA yielded a highly significant F (F(3,84) = 14.7763, p < .001). The means corresponding to each phase are presented in Table 9.

Table 9

Means of Appropriate Behaviors Corresponding to Study Phase

<table>
<thead>
<tr>
<th>Pre-Training</th>
<th>Post-Training</th>
<th>Post-Retraining</th>
<th>Follow-Up</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.3793</td>
<td>25.2414</td>
<td>23.7931</td>
<td>20.1724</td>
</tr>
</tbody>
</table>

A Newman-Keuls test (at the 05 level) on these means indicated that with the exceptions of training versus retraining, and retraining versus follow-up, all means were significantly different from one another. In other words, Ss improved over the baseline level following training, with such improvement leveling off (with slight decreases) during retraining and follow-up. When the study was completed, experimental Ss were still displaying a higher level of skill enactment than at the pre-training phase.

Where inappropriate target behaviors were concerned, the ANOVA revealed that experimental Ss did not perform differentially across phases (F(3,84) = 0.8661, p = .46). The frequency of undesired
responses was approximately the same as the study progressed from pre-
training through training and retraining to follow-up ($\bar{x}$s = 10.7421, 9.5517, 10.8621, 8.8621 respectively).

It is somewhat interesting to note that control Ss also showed improved performance over time, in terms of exhibiting appropriate behaviors ($F(3,24) = 4.5368, p = .01$). However, the Newman-Keuls test indicated that the only significant difference was between pre-training and retraining scores ($\bar{x}$s = 15.7778 and 25.6667 respectively, $p \leq .05$), which is plausible inasmuch as the retraining session was in effect the first training session undergone by these Ss, the initial "training" session being unrelated to desired skill enactment. At follow-up, decrements in appropriate behaviors were evident among control Ss ($\bar{x} = 19.8889$), although still somewhat higher than original base rates. For these pupils, no change was evident in the category of inappropriate behaviors throughout the four phases of the study ($F(3,24) = 1.1073, p = .37$).

Session Intervals

It might be recalled that for observation purposes, each small group session was divided into three 5-minute intervals, corresponding to the beginning, middle, and final portions of each session. It was of interest to compare Ss' role behaviors across intervals to assess how they performed as the small group session took its course. In order to test this, a repeated measures ANOVA was run, keeping separate desired responses from undesired ones. For the former, it was found that interval differences did in fact exist ($F(2,74) = 19.7396, p \leq .001$). Specifically, Ss displayed significantly more appropriate
behaviors during the early stages of the session ($\bar{x} = 31.4737$) than at either the middle or final stages ($\bar{x}_s = 26.6316$ and $26.2105$ respectively), which did not deviate from each other. A Newman-Keuls test confirmed the above finding ($p < .05$).

The ANOVA on inappropriate behaviors was also significant ($F (2,74) = 8.3480$, $p < .001$). A Newman-Keuls test indicated that the frequency of undesired responses did not differ during the first and second intervals ($\bar{x}_s = 12.2895$ and $13.2895$ respectively) but increased appreciably at the third interval ($\bar{x} = 15.5263$), differing significantly from both the first and second intervals ($p < .05$). Taken together, the above results strongly suggest that $S$s in the study not only decreased their appropriate behaviors but also increased undesired ones as the small group session progressed.

Other Tests of Differences

$T$ tests were computed to analyze for specific differences between discrete groupings. It was found that male and female $S$s did not differ in their acquisition scores following both training and retraining ($t(34) = 1.00$, $p = .33$; $t(40) = 1.33$, $p = .19$ respectively). Similarly, grade level was not a determinant of content learning at both phases (training acquisition: $t(34) = 0.70$, $p = .49$; retraining acquisition: $t(40) = 0.20$, $p = .84$), although interestingly, kindergarteners had slightly higher acquisition scores than first graders.

Striking differences, however, were apparent between the two sessions in which $S$s were monitored, the first being in the regular classroom and the second in the experimental area where training was conducted (representing a simulated classroom situation). These are
illustrated in Table 10.

Table 10
T Tests on Appropriate Role Behaviors Between Type of Session

<table>
<thead>
<tr>
<th>Type</th>
<th>Session 1</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>t*(df)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>9.4583</td>
<td>3.655</td>
<td>4.86 (47)</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Session 2</td>
<td></td>
<td>14.667</td>
<td>6.278</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retraining:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>9.3095</td>
<td>4.075</td>
<td>6.47 (41)</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Session 2</td>
<td></td>
<td>14.452</td>
<td>3.690</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Follow-Up:</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>7.7500</td>
<td>3.043</td>
<td>7.54 (43)</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Session 2</td>
<td></td>
<td>12.4545</td>
<td>3.144</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* t test for correlated means.

As the data show, Ss displayed significantly more desired responses in the simulated classroom situation than in the actual class setting.

In terms of inappropriate behaviors, the two sessions did not differ from each other except during follow-up. Here, Ss in the second (simulated) setting evidenced a greater frequency of undesired responses than in the regular classroom (correlated means t(43) = 2.74, p = .01). For this phase, it appears that Ss' behavior rates were higher in the second session than the first, where both appropriate and inappropriate behaviors were concerned.
Correlations

Correlations were computed between certain demographic variables and performance of appropriate as well as inappropriate behaviors. These are presented in Tables 11 and 12.

Table 11
Correlations Between Demographic Variables and Appropriate Responses

<table>
<thead>
<tr>
<th></th>
<th>Pre-Training</th>
<th>Training</th>
<th>Retraining</th>
<th>Follow-Up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade</td>
<td>-.4839**</td>
<td>.2491</td>
<td>-.3335*</td>
<td>.6650**</td>
</tr>
<tr>
<td>Sex</td>
<td>-.1694</td>
<td>.2441</td>
<td>-.2484</td>
<td>.0571</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>-.1092</td>
<td>-.0284</td>
<td>.1699</td>
<td>.2069</td>
</tr>
<tr>
<td>No. of Siblings</td>
<td>-.1448</td>
<td>.1201</td>
<td>-.1208</td>
<td>.0200</td>
</tr>
<tr>
<td>No. of Parents Living With</td>
<td>-.1702</td>
<td>.3191*</td>
<td>-.2094</td>
<td>.2222</td>
</tr>
<tr>
<td>Metropolitan Test Percentile</td>
<td>-.4319**</td>
<td>.1809</td>
<td>-.1723</td>
<td>.7105**</td>
</tr>
<tr>
<td>Verbal IQ</td>
<td>.0364</td>
<td>-.0956</td>
<td>.0409</td>
<td>.1551</td>
</tr>
<tr>
<td>Performance IQ</td>
<td>-.0793</td>
<td>.2134</td>
<td>-.0636</td>
<td>.2272</td>
</tr>
<tr>
<td>Full Scale IQ</td>
<td>-.0137</td>
<td>.0385</td>
<td>-.0059</td>
<td>.2053</td>
</tr>
</tbody>
</table>

* p \( \leq .05 \\
** p \( \leq .01 \\

Grade level correlated significantly with appropriate responses at pre-training, retraining, and follow-up. However, the direction of the relationship was not uniform: kindergarten Ss displayed more desired behaviors during the pre-training and retraining periods, but
first graders outperformed kindergarteners at follow-up. It was also found that Ss living with both parents exhibited more appropriate behaviors following training than those living with just one parent. The only other variable to correlate significantly with the appropriate target measures was percentile on the Metropolitan Test. Here again, the results were somewhat conflicting: Ss with high Metropolitan scores performed less well than their low counterparts during pre-training, but better at the follow-up phase. Sex, ethnicity (part-Hawaiian or otherwise), number of siblings, and IQ scores did not correlate significantly with performance of appropriate responses.
From Table 12, it is seen that grade level again covaried with the performance of inappropriate behaviors. Here, the results were uniform: at pre-training, training, and retraining, first grade Ss displayed a significantly higher level of undesired responses than kindergarteners. Number of siblings also correlated positively with frequency of inappropriate behaviors at three of the four phases of the study; that is, the greater the number of siblings, the more likely the S would exhibit an undesired behavior, except after training. None of
the other variables correlated significantly with the inappropriate target responses. It was also found that Ss' socio-economic level, in terms of their parents' education and occupation, was not a covariate of the performance of either desired or undesired behaviors.

As expected, IQ was a determinant of acquisitional ability, although Ss' performance IQs did not correlate with acquisition after training (see Table 13).

Table 13
Correlations Between IQ and Acquisition

<table>
<thead>
<tr>
<th></th>
<th>After Training</th>
<th>After Retraining</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verbal IQ</td>
<td>.6477**</td>
<td>.5922**</td>
</tr>
<tr>
<td>Performance IQ</td>
<td>.2816</td>
<td>.5987**</td>
</tr>
<tr>
<td>Full Scale IQ</td>
<td>.5423**</td>
<td>.6407**</td>
</tr>
</tbody>
</table>

** p \( < .01\)

Additionally, it was interesting that Ss' generalization performance as a whole did not covary with their acquisition scores. Following training, acquisition and performance correlated at \( r = -.0957 \) \((p = .58)\) for desired behaviors, and at \( r = -.2815 \) \((p = .10)\) for undesired responses. After retraining, the correlations were \( .3976 \) \((p = .01)\) and \( -.2919 \) \((p = .06)\) respectively. Only in the case of retraining was there a direct linkage between how well an S learned the training content and with what frequency he enacted the appropriate skills. Finally, it might be pointed out that the performance of
appropriate behaviors was relatively independent of the performance of inappropriate ones ($r = -0.2501, p = .13$). In other words, an S who exhibited a high rate of desired responses did not necessarily display a low rate of undesired responses, and conversely.

Peer Interaction Data

A final source of data, which served as supplemental information on the target behaviors of this experiment, involved peer interaction patterns during the small group sessions. These patterns were recorded off videotapes in the form of running narratives, which were content analyzed for recurrent patterns as well as cross-checked with the observational (target behavior) data to determine if there were any correspondences. As a result of these procedures, the following trends appeared to emerge:

1. As a whole, the rate of peer interactions during small group work in the classroom setting was fairly high. Most of such interaction was of a verbal nature, and usually involved two pupils, or pairs of pupils, as distinct from the whole group interacting.

2. There were, however, rather discernable individual differences in the tendency to relate with a peer. Some pupils kept mainly to themselves during the entire session, some others would respond when another child addressed them, and others still were active in initiating interactions throughout the session. Moreover, these propensities appeared to be somewhat invariant across different sessions.

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21 A sample transcript is presented in the Appendix.
3. The major types of interactions seemed to be (not necessarily in order):

(a) Helping behaviors--these included helping another on an assignment, directing another to the appropriate stimulus, and sharing certain work materials. Such help could have been either solicited or unsolicited.

(b) Interfering behaviors--examples here included grabbing another's work supplies, arguing, and hitting, shoving, or fighting.

(c) Teasing behaviors--these could be construed as a milder form of interfering behaviors, and consisted of such responses as verbal teases, facial gestures, and patting or jabbing another lightly.

(d) Admonishing behaviors--a special form of helping in which one pupil practically assumed the teacher's role by telling another to behave in a certain fashion; scolding was sometimes involved.

(e) Socializing behaviors--here, two or more pupils engaged in verbal interchanges unrelated to the task at hand.

Although the above categories may be considered mutually exclusive, often a given interaction would involve two or more of them.

4. In cross-checking the interaction and target behavior data, there did not seem to be a relationship between frequency of interactions
and performance of inappropriate responses. A likely explanation for this is that the undesired response displayed most often (by all Ss) was 'getting out of chair', whereas peer interactions did not necessarily involve the pupil being out of his seat. However, there appeared to be an inverse relation between frequency of interactions and manifestation of appropriate behaviors: often, those who interacted least performed the greatest number of desired responses, and vice versa. This result may be due partially to the competing function of peer interaction. That is, when a pupil was engaged in an exchange with another, he would have less opportunity to display certain appropriate target responses (e.g., working on his own materials, raising hand to seek help)\(^\text{22}\) than when he was not interacting with another.

Although the above data add to one's understanding of pupil behaviors in a small group context, they should be regarded with some caution. In the first place, the information pertained to only 8 Ss (first graders), and may not be generalizable to the larger sample. Secondly, although the observers (Ps) constructed the interaction transcripts as objectively as possible, a certain amount of subjectivity or selectivity was inevitable. Hence, some interactions might not have been recorded, and of those which were, some might have been emphasized more than others.

\(^{22}\) It might be noted that failure to display the two behaviors given in this example did not necessarily constitute inappropriate responding. The undesired counterpart of 'working on own materials' was 'using others' materials', and the counterpart of 'help-seeking' was 'calling out for the teacher'.
CHAPTER VI
Discussion and Conclusion

Interpretation of Findings

When treatment effects were analyzed for specific target behaviors, three emerged as significant or near-significant. These were 'sitting appropriately'; 'answering questions', and 'not answering questions'. For the first, there was a marginal main effect of training condition ($F(2,30) = 2.5789, p = .09$), where the Instructions (I) and Instructions plus Modeling (IM) conditions appeared equal to each other and slightly more effective than the Instructions plus Modeling plus Rehearsal (IMR) condition. This suggests that where sitting appropriately (or staying in one's seat) was concerned, modeling did not augment the training impact and rehearsal actually decreased it. A possible explanation for this is that the behavior in question was one which Ss already possessed, and hence further demonstration of it was not likely to add anything to the pupil's repertoire. In terms of rehearsal, this element was again not instrumental in inducing Ss to stay in their chairs any more than the other experimental training conditions. It should be noted that this target behavior was checked (by Os) at the beginning of each 5-minute interval during the session, and was not a continuous frequency count. For the behavior of 'not sitting appropriately', which was checked as often as it occurred, no treatment effects were found. In other words, Ss across groups were out of their chairs with equal frequencies, although IMR Ss were in their chairs a little less often than I or IM Ss at the beginning of
each interval during the small group session.

Taking the responses of 'answering questions' and 'not answering questions' together, the most striking difference was between IMR - reward and IMR - no reward Ss. The former treatment combination appeared to be among the most effective (in terms of eliciting the desired behavior and discouraging the undesired counterpart) whereas the latter was among the least effective. These training X reward interactions (answering: $F(2,30) = 3.0929, p = .06$; not answering: $F(2,30) = 3.2759, p = .05$) indicate that whether one introduced an expectancy of reward could make a critical difference in Ss' subsequent responding. For IMR - reward Ss, transfer of training was enhanced, as might be expected; however, IMR - no reward Ss displayed relatively poor performance where answering questions was concerned. For these latter Ss, it could be that the lack of an anticipated outcome for their efforts during training developed in them a negative set which was responsible for their performance at the small group session (e.g., "why should I perform the appropriate behaviors when nothing is forthcoming?"); conversely, IMR - reward Ss, expecting reinforcement for desired responding, were more motivated.

The training X reward interaction was again reflected when the data were analyzed for all appropriate behaviors combined ($F(2,30) = 2.2188, p = .13$), as well as in the analysis of the first grade sub-sample ($F(2,12) = 3.5757, p = .06$). Although this interaction was not highly significant, it merits some discussion inasmuch as it illustrates rather divergent effects produced by different treatment combinations. Figure 1, which plots means of appropriate behaviors for both
grades combined, highlights this interaction (see Figure 1).

As can be seen, for I Ss, whether reinforcement was offered or not did not make any difference. For IMR Ss, those receiving an expectancy of reward clearly outperformed those who had no expectation, as discussed earlier. The case of IM Ss is perhaps most puzzling. IM - reward Ss actually performed fewer appropriate responses on the average than their IM - no reward counterparts. Indeed, IM - no reward, together with IMR - reward, was the most effective treatment combination. The reasons for this are unclear, although one conjecture --invoking the notions of effort and interference-- seems plausible.

Ss in the Instructions condition were exposed to a relatively minimal training regimen, in which little effort was required on their parts; as such, the training impact may have been small, with the result that whether or not a favorable outcome was introduced became irrelevant. On the other hand, Ss who were exposed to instructions and modeling, and additionally were required to practice the desired responses, expended a fair amount of energy during the training. Given this set of conditions, the training impact was strong and when this was coupled with reward expectancy, motivation also increased; however, IMR Ss who received no expectancy might have felt that their effort invested during training was for nought, and hence made no attempt to generalize their learning. Where IM Ss were concerned, the training regimen, although somewhat more elaborate than simple instructions, also did not require a great deal of effort beyond passive viewing. Thus, the lack of an anticipated outcome would not induce a negative orientation on Ss' parts, as it might have for IMR -
Figure 1: Treatment Group Means of Appropriate Behaviors
no reward Ss. Conversely, introducing a reinforcement expectancy for IM Ss might have produced an excessively positive orientation, in that these pupils were so eager to receive the reward that their overall behavior rate during generalization was diminished, for fear that they would perform undesired responses. In other words, coupling reward with IM might have interfered with the performance of appropriate behaviors by suppressing Ss' spontaneity to some extent.

One of the most important findings in the study, in terms of practical implications, is the significant main effect of reward expectancy in the regular classroom \( (F(1,30) = 4.1121, p = .05) \). As predicted, Ss who received such an expectation displayed a higher level of skill transfer than those who had no outcome anticipation (see Figure 2). This finding is probably attributable in large part to the former group's greater incentive to perform the desired responses, although, as just discussed, this incentive function may not have acted uniformly across all Ss. Of interest also is the finding that reinforcement expectancy failed to make a difference in generalization in the simulated classroom setting. This result is traceable to at least three factors.

First, Ss were monitored in the regular classroom soon after training, whereas the session in the simulated classroom did not occur until a few hours had elapsed. Hence, the expectation of reward was likely to have been more salient in the former situation than the latter, resulting in greater corresponding performance. Secondly, the reward variable was introduced by the trainer (T) in the following way: "... If you do the good things (appropriate behaviors) you've
Figure 2: Performance of Appropriate Behaviors in the Regular Classroom, Reward versus No Reward Subjects
learned here just now back in small group work in class, I'll give you three Kikaida cards later on, okay? ... ." The words "in class" may have signified the regular classroom for many Ss, who then made no special effort to behave appropriately in the second setting. Finally, there was the possibility of contamination. As mentioned in the previous chapter, peer interactions occurred rather frequently, both in and out of class. By the time Ss were monitored in the simulated classroom, most if not all of those Ss who were given no reward expectation had probably discovered from their peers that some form of reinforcement might be forthcoming, and thereby increased their rate of appropriate responding in hopes that they too might partake of the reward.

Generally, there were no acquisitional differences among the three experimental training groups (I, IM, IMR). All Ss evidenced a fairly high rate of learning following training, and even better acquisition after retraining (correlated means $t(32) = 2.62, p = .01$). Not surprisingly, pupils' IQs correlated with their acquisition scores, both after training ($r = .5423, p \perp .01$) and retraining ($r = .6407, p \perp .01$). However, it was interesting that Ss' generalization performance following training did not covary with their acquisition of the training content (appropriate behaviors: $r = -.0957, p = .58$; inappropriate behaviors: $r = -.2815, p = .10$). The most likely explanation for this is that learning differences among Ss were neutralized during the acquisition test through I informing them of the correct response when an incorrect one (or none) was given. Indeed, this procedure was designed to equate treatment groups so that whatever
transfer differences as may have arisen could be attributed to divergences in training rather than variations in learning.

Another finding of interest is that the frequency of appropriate responding by experimental Ss showed marked changes as the study progressed through its four phases \((F(3,84) = 14.7763; p \leq .001)\). This is illustrated in Figure 3.

From the graph one notes that post-training performance rose dramatically over the initial baseline, and showed progressive decreases at retraining and follow-up. This curve is reminiscent of certain baseline-intervention studies (e.g., ABBA designs) although it is somewhat encouraging to note that the rate of appropriate responses during follow-up did not fall back to the original operant level. Due to time limitations, it was not possible to monitor Ss on a longitudinal basis to appraise whether their gains from training would endure. Lacking such information, it is not known whether, with the passage of time, Ss' appropriate behaviors would stabilize or show further decrements. Also, it was unfortunate that the retraining evidently did not serve to heighten desired performance above that displayed after the first training period.

The analysis of session intervals revealed that Ss as a whole were best behaved at the beginning of the small group session, performing progressively worse as the session continued. This was true for both desired and undesired responses \((F(2,74) = 19.7396, p \leq .001; F(2,74) = 8.3480, p \leq .001\) respectively)--the frequency of the former decreased, and that of the latter increased. A possible explanation for this is that Ss were more likely to be oriented toward their task
Figure 3: Appropriate Responding at each Study Phase
when they were getting started than when some time had elapsed. At
the outset, the assignment had just been given, task demands were
fairly explicit, and the likely behavior was to at least give the
assignment a try. However, when the task had been completed (or near-
completed), performance cues became vague and pupils resorted to doing
what was most readily available or attractive, which often entailed
the manifestation of inappropriate behaviors. In line with this, peer
interactions also increased as the small group session progressed; al-
though the relationship of these to the target behaviors in the study
is not well defined, it is probable that some of these interactions
gave rise to undesired responses, or at least prevented the occurrence
of desired ones.

It is also interesting that kindergarten Ss as a whole were
better behaved (more desired behaviors and fewer undesired behaviors)
than first grade Ss. Intuitively one might have expected otherwise,
inasmuch as the latter group had had more time to adjust to being in
school. Individual differences might have accounted partially for
this difference. Additionally, it could be that first graders had
more opportunities to test teachers' limits, and had "gotten away"
with undesired responses to a greater extent than kindergarteners.
With time, it seems likely that the first grade Ss in this study will
become better behaved, assuming classroom management techniques are
systematically employed by their teachers. For instance, informal
observation has revealed that the present second grade class, which
also presented some problems in the past, was generally high in per-
formance of appropriate behaviors.
Finally, a result which deserves some comment is the difference in Ss' appropriate responding between the actual classroom and the simulated class setting. At all three phases of training, retraining, and follow-up, pupils enacted significantly more desired behaviors in the simulated classroom than in their regular one ($t(47) = 4.86, p < .001$; $t(41) = 6.47, p < .001$; $t(43) = 7.54, p < .001$ respectively). At least two interpretations of this finding are plausible: first, the literature on generalization gradients has quite amply demonstrated that transfer of training is likely to occur to the extent that the new situation has properties similar to the original one. In the present case, the simulated classroom was the identical setting in which training took place; moreover, the teacher (ST) at this session was the same person whom Ss viewed and heard in the training films, and the work materials depicted in the films (cuisenaire rods) were also the ones which Ss utilized during this small group session. In contrast, the regular classroom lacked some of the contextual cues of the experimental area, the teacher there had nothing ostensibly to do with the training, and the work materials present were usually not cuisenaire rods. Given these divergences, it was possible that the simulated classroom activated a higher degree of skill generalization in Ss than the regular classroom.

Secondly, the small group session in the simulated setting was of a more structured nature. Pupils were monitored continuously by ST, who also gave periodic directions such that task demands were rarely unclear. In addition, the Ss were in a self-contained situation where outside interference was held to a minimum. These conditions
were generally lacking in the actual classroom. Again, this factor could have contributed largely to the greater frequency of appropriate role behaviors by Ss in the simulated classroom than in the regular one.

Implications and Future Research

From a theoretical point of view, the training X reward interaction is of interest. It suggests that, given a set of appropriate classroom responses, whether one introduced an expectancy of reward into a particular training regimen could produce appreciable differences in performance. In reviews of previous research (e.g., Bandura, 1971; Zimmerman & Rosenthal, 1974), modeling coupled with reinforcement has been reported to augment imitation in some cases, compared with modeling alone, and to be equally effective in other studies. In the present experiment, the reward variable actually led to decrements in desired behavioral transfer. Also, this study's results indicate that associating reinforcement with a training procedure involving rehearsal could substantially heighten appropriate performance. These are areas that future research could fruitfully explore and clarify. It should be pointed out that although the present findings are not totally commensurate with previous results, this experiment differs from most earlier studies in two important respects: the focus here was classroom role behaviors, and the reward manipulation was an expectancy variable. The existing literature, on the other hand, usually deals with responses not linked to academic skills, and employs either vicarious or direct reinforcement rather than expectation of reward,
The lack of a training main effect also poses some interesting questions. In this regard the following issues appear to be relevant. First, as discussed in the foregoing, there was a fair amount of peer interactions during the small group sessions. Hence, the enactment of desired responses might have been interfered with to the extent that the immediate stimuli---that is, peer behaviors---exerted more influence. For example, it was unlikely that a pupil would continue to work non-disruptively if the child next to him kept on speaking to him or grabbing his materials. Similarly, a child would not be induced to follow the teacher's directions if socializing with a peer was more gratifying to him at that time. This does not indicate that peer interactions were necessarily undesirable in the classroom context. Indeed, it was shown that many of these behaviors were productive, involving mutual help or prompting. However, peer exchanges, as well as perceived peer disapproval, could serve to interfere with the manifestation of certain appropriate class-relevant responses.

Secondly, it is reasonable to conjecture that the target behaviors of interest were ones which Ss, for the most part, already possessed. The pre-training data indicated that pupils did engage in these responses (especially inappropriate responses), although it was difficult to determine the extensiveness of each S's repertoire. Also, the high level of acquisition, although partially attributable to the training regimen, suggests that Ss were probably not learning something entirely novel. In this perspective, the training that was conducted should be viewed not so much in terms of its efficacy in establishing responses, but more in terms of its response evocation.
function. In other words, previous research has typically utilized modeling, rehearsal, and reinforcement as means to promote imitation of new behaviors, with generally favorable results. Here, the responses were not new, and hence the effectiveness of these procedures might have been correspondingly undermined.

Thirdly, and in line with the above, there was a large amount of variance in behaviors among Ss in each treatment combination. Often, treatment group means (e.g., for appropriate behaviors) fell in the predicted direction but the wide variation in scores rendered the statistical test nonsignificant. Of course, this could mean that the respective training procedures had no impact. However, it could also indicate that pupils had differential behavioral propensities (i.e., a high, medium, or low rate of responding in general) which, despite the training, persisted throughout the study. If this was the case, instructions, modeling, and practice were not likely to produce much difference. On the other hand, such methods as extensive prompting and introducing strongly positive or negative outcomes might have reduced the behavioral variance to some extent.

Accordingly, implications for further research include: the necessity to document peer interaction patterns more precisely—the nature of these behaviors and their function in facilitating or inhibiting other class-related skills; the need to study modeling and associated processes relative to academic performance—the efficacy of these manipulations in terms of both cultivating novel skills (e.g., with preschoolers) and eliciting pre-established responses; and the advantages of exploring other variables which potentially facilitate
skill enactment, such as prompting, provision of memory codes, and vicarious or direct reinforcement for the pupil. In addition, it would be instructive to separate the components of instructions, modeling, and rehearsal to a greater extent than was done in this study.

The expectancy of reward variable also deserves further research. It was found that Ss who were given an expectation of reinforcement, contingent on appropriate performance, displayed significantly more desired responses in the classroom setting than Ss who had no expectation. From an applied standpoint, a distinct asset of this variable is its economy of manipulation. In this study, the reward expectancy was introduced simply by the trainer telling S that if he behaved as instructed, a concrete reward was forthcoming. This obviated the necessity to dispense immediate direct reinforcement as the small group session was held, something which would have been impractical to do as well as confounding since both reward and no-reward Ss worked together. However, two points should be mentioned. Expectancy of direct reinforcement and actual direct reinforcement, although they may lead to the same effects, are conceptually different variables. In particular, the former assumes a greater degree of cognitive activation (expectation--incentive--performance) than the latter. Direct reinforcement could strengthen behavior even when the S is not cognizant of the reinforcement contingency (Skinner, 1953), whereas a reward expectancy manipulation could only exert its influence when such an awareness is present. Also, the choice of reward, whether direct or anticipated, is of utmost importance. In some cases,
such as with young children, it is necessary to delve somewhat into Ss' "subculture" so as to ascertain what objects or events have truly rewarding properties, and which do not. This is especially true when resources (for acquiring reinforcers) are limited, as is most often the case. Clearly, a reward manipulation will have no effect if Ss found the reinforcer to be unattractive in the first place.

Finally, an indirect finding of the present research is the power of the environment on behavior. Ss exhibited varying response frequencies depending on the stage of the small group session, and they enacted appreciably more desired behaviors in the simulated classroom situation than in the regular classroom. Of course, social behaviorists of different persuasions (e.g., Bandura, 1969; Mischel, 1968; Skinner, 1953) have long argued that external setting variables are major determinants of behavior. Indeed, as mentioned in Chapter II, most behavior change attempts, in the classroom or elsewhere, are centered around manipulating environmental contingencies. However, it should be noted that external manipulations have seldom been coupled with training procedures (or working directly with the individual), except in certain clinical studies and single subject designs. In the area of skill training, it would be fruitful if future research focused on these two features in conjunction with each other. Either approach by itself may not be sufficient to produce the optimal type and rate of responding, especially if the behaviors involved are numerous and complex. A fairly recent area of research which may prove promising in this regard is that of training-in-context. Briefly, the procedures used under this paradigm involve training the
in the same setting or situation in which he is expected to perform subsequently.

**Perspective on Applied Psychological Research**

The present study was an attempt to address an important practical issue—-in a direct sense, that of skill training in early elementary children, and indirectly, that of improving the learning of pupils in schools. The assumption was that psychological research could and should make contributions to resolving social problems, many of which surface in the environment of the school. Within the discipline of psychology itself, there is no consensus as to both the desirability and feasibility of applied research. At one extreme, there are those who argue that research should be restricted to the highly controlled conditions of the laboratory, and that studies conducted in field settings constitute a violation of the scientific method. At the other extreme, it is contended that without expansion into the natural environment, psychology would remain at best "a science of white rats and college sophomores." The position of this writer reflects a merger of sorts—-that theory-based research is still vitally needed but also that more investigations should be conducted in natural settings with diverse populations, so as to better understand real-life phenomena and to cope more effectively with them.

Applied research entails the resolution of certain questions of ethics and responsibilities. Although there are no definitive criteria as to the types of functions a practical researcher must perform, the literature indicates some general concerns: first, and perhaps most importantly, the research should benefit the population
under study (Fairweather, 1967; Goering & Cummins, 1970). This may seem to be a foregone conclusion, but the amount of recent protest among certain "subject" populations (e.g., various ethnic groups) against "exploitative research" necessitates the researcher to re-evaluate the nature and purpose of this activities (Dodson, 1971). Moreover, the benefits accruing to the persons involved should preferably be of a concrete nature. Secondly, the range of issues or problems to be researched should be defined in large part by the exigencies of the population rather than solely abstract considerations. Thirdly, the applied researcher should seek to enlist the support and cooperation of all concerned individuals, and deal with whatever resistances as may arise instead of ignoring or circumventing them.

In the present investigation, an effort was made to take the above factors into account. This was done by selecting as target behaviors skills which are generally assumed to be useful for pupils to acquire; by dispensing reward tokens to the Ss for their participation in the experiment as well as for their performance; by consulting extensively with the staff of the school on problem areas and proposed strategies; and by attempting to resolve difficulties whenever these were evident.

Indeed, constraints at various levels emerged during the implementation of this study. For instance, because the research building was still under construction at the early stages of the experiment, first grade Ss were trained and monitored (for the simulated classroom session) in the cafeteria, which was the only available space. This setting was acceptable but it was not the most desirable
location for training. Limited resources constituted another problem. Inasmuch as the study involved the usage of audio-visual equipment, at times the research was suspended (although never drastically) when such equipment was unavailable. A third example pertained to the operational network of the school. Due to various pre-existing schedules, the number of small group sessions to be monitored was reduced and the duration of each was shortened, as otherwise the experiment would have infringed on the teachers' class plans. Lastly, a potential source of data--teacher ratings of pupil target behaviors--was eliminated inasmuch as the teachers had already a large workload. These are mentioned here not to imply that the school staff was not cooperative, which they were abundantly, but to highlight certain areas (among many others) in which difficulties could arise in applied research, and to suggest that compromise is often necessary.23

In sum, given the multiple tasks and responsibilities an applied researcher may have to perform, he should, to be optimally prepared, possess a wide-ranging set of skills. These include the ability to anticipate problems and to plan for their prevention or resolution, the ability to interact with all involved persons, including subjects, in a sensitive and judicious manner, the ability to innovate and evaluate his procedures in terms of not only their theoretical but also their practical consequences, and the ability to function in radically different roles according to the demands of

23 Reppucci and Saunders (1974) have provided an excellent discussion of some of the problems attendant to research or intervention in natural settings.
particular situations (Bloom, 1973; Leary, 1972; O'Neill, 1972; Thomson, 1971). Of course, as Shellow (1970) points out, applied psychological research is not without personal rewards. The investigator, in the course of his study, carries away a better understanding of many practical issues from which he can begin to construct a theory base that is more relevant to social realities and progressively more accurate in its application guidelines. By this process, the much-heralded but as yet little-effected cycle of theory-research-practice in the social arena may actually begin to take shape.

Concluding Remarks

Future research could further clarify the efficacy of modeling, rehearsal, and reinforcement procedures for training children in class-relevant skills. Although the present study did not yield dramatic findings related to training regimen, this topic area seems to warrant further investigation due to its practical significance and the paucity of data that exists regarding it. Moreover, modeling processes should be explored with respect to both their response development function and their behavior elicitation potential.

On a broader level, the generic area of observational learning should receive greater attention than at present by school personnel and researchers. There is little question that pupils learn a great deal from watching others, whether peers or teachers. The issue then revolves around how best to channel this phenomenon into the promotion of important content learnings. Along similar lines, as Cole and Bruner (1971) note, teachers could beneficially devote more energies toward getting the child to transfer skills already in
his repertoire to the particular task at hand. Failure to demonstrate a given skill by a pupil has often in the past been assumed to indicate absence of that skill (the deficit interpretation). However, more recent research (e.g., reviewed by Cole & Bruner, 1971) has shown that the nature of the task and demand characteristics could be critical determinants of skill enactment. This study has suggested that reward expectancy and setting variables are also important factors. In the final analysis, it is incumbent upon teachers and educational researchers alike to discover the motivational and environmental concomitants to optimal functioning by children. This would require the assessment of alternative training procedures, teaching styles, class organization formats, and ultimately it would necessitate change. Such a process must be predicated on the belief that children are not there to occupy schools, but that schools are there to serve children.
APPENDIX A

Definitions of Target Behaviors

Frequency counts were taken on all behaviors except 'sitting appropriately' and 'working on own materials', for which observers simply checked at the beginning of each 5-minute interval. All observation periods lasted for 15 minutes.

1. Sitting Appropriately:  $S$ remains in his own chair;
   $S$ could be sitting or kneeling;
   moderate bouncing up and down is okay.

   Getting Out of Chair:  $S$ actually leaves the chair;
   $S$ standing up.

   Attending to Teacher:  When the teacher starts speaking,
   either to the whole group or to $S$
   specifically, $S$ watches the teacher;
   Okay if $S$ looks in teacher's direction
   or at other object (e.g., worksheet)
   as long as teacher is referring to
   that object;
   $S$ does not have to watch the teacher
   if the latter is speaking
   specifically to another child.
Not Attending: During teacher's verbalization, S looks away for 5 seconds or more;
Includes looking at another pupil and/or around the room.

Working on Own Materials: S uses only materials (worksheets, rods) in front of him.

Using Others' Materials: S uses another pupil's materials; includes touching, grabbing, and throwing others' materials;
Does not include materials not on the table;
Does not include just looking at others' work.

Being Silent: When the teacher speaks, S does not talk;
Applies only when the teacher is speaking to the whole group or to S specifically.

Speaking Out of Turn: S speaks during the time teacher is speaking to the whole group or to S;
S's verbalization counted as one
response unit unless verbalizations are separated by an interval of 5 seconds or more;

Includes yelling out and talking to a peer.

Answering Questions: \( S \) answers verbally a question posed to him specifically by the teacher;

Okay if response is incorrect, so long as it is verbal.

Not Answering: \( S \) does not respond verbally to a question posed to him by the teacher;

Includes nodding or shaking head.

Following Directions: \( S \) begins to respond appropriately to a direction given by the teacher;

The direction could be given to \( S \) specifically or to the whole group.

Not Following Directions: \( S \) does not respond appropriately to a teacher direction;

Includes doing nothing and/or starting to do something else.
<table>
<thead>
<tr>
<th>Seeking Help</th>
<th>S raises hand, waits quietly to be recognized, and either asks the teacher for help verbally or shows work to the teacher;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appropriately:</td>
<td>Applies only when S is actually recognized by the teacher.</td>
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<tr>
<td></td>
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<tr>
<td>Seeking Help</td>
<td>S calls out for the teacher (with or without raising hand), and/or S goes up to the teacher (with or without bringing the work).</td>
</tr>
<tr>
<td>Inappropriately:</td>
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</tbody>
</table>
APPENDIX B

Acquisition Test Questions

Experimental Ss

1. At small group work, should you stay in your chair or get out of your chair?
2. When the teacher is talking, who should you be looking at?
3. Should you use your own materials or other children's materials?
4. When the teacher is talking, should you be quiet or should you make noise?
5. If the teacher asks you a question, should you answer her or not answer her?
6. If the teacher tells you to do something, what should you do?
7. When you cannot work any more, should you call out for the teacher or raise your hand and wait quietly?
1. Whom was the story about?

2. What color clothes did Robin Hood wear?

3. Whom did Robin Hood marry?

4. Whom was Robin always hiding from?

5. When Robin stole money, did he give it to the rich people or the poor people?

6. At the archery tournament, how many times did Robin hit the bullseye?

7. At the end of the story, did Robin and his friends escape on a train, a ship, or an airplane?
<table>
<thead>
<tr>
<th>Session Date</th>
<th>AM/PM Session</th>
<th>Observer</th>
<th>Interval Number</th>
<th>Subject A</th>
<th>Subject B</th>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ASKS IMPROPRIETELY</td>
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<td></td>
<td></td>
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<td></td>
<td>RAISES HAND, WAITS, ASKS</td>
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<td>Does Not Follow</td>
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<td></td>
<td>Follows Directions</td>
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<td>Does Not Answer</td>
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<td></td>
<td>Answers Verbally</td>
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<td>Turn, Speaks Out Of Teacher Speaks When Silent</td>
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<td></td>
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<td>Others Materials</td>
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<td>Own Materials</td>
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<td>Does Not Watch</td>
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<td>Watches Teacher Speak</td>
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<td>Out Of Chair</td>
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<td></td>
<td>In Chair</td>
<td>(X)</td>
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</table>
APPENDIX D
Peer Interaction Transcript

Follow-up 2/6
11:00-11:30 Group 1
Tape 7, begin at 2 min.

Shelley (S)  Absent: Margie
Lorianne (L)
Wade (W)
David (D)
Dwayne (Dw)
Rodney (R)
Kristine (K) (back to camera)
Teacher (t)

Before start t is telling Group 1 and others closer to camera
that today they are going to make comic strips about how the earth began,
four different pictures in sequence, "squares or rectangles." Fire,
vulcanoes, rain, and mountains in that order.

3.0 first interaction. Up to this point they are answering questions.
David makes motion with hand in air, says to no one "au, au, tau, au, " (t is Miss Au), then turns to Dw, and smiles as he finishes.
Dw ignores him. t bends over table, draws squares, talking. Asks
question and several answer in unison. W crawls on top of table,
watches, lies on table. D has to stand to see around him, resumes
seat as t starts to distribute one pencil with eraser to each,
along with paper. (Note, no need for sharing).

3.6  W leans over says: ...(to D or Dw, repeats to D, then leans back).
D leans back, asks: What? (W repeats twice). D replies to him.

4.0  R or someone says: C'mon David (twice) (as t hands around papers).
D looks at him somewhat surprised. Dw gets his paper. D looks
at him as he starts to draw squares, says something. Dw replies.
D continues to look at Dw while holding hand up for his paper (he had not yet received it—Dw got his first because he did something right, according to t). Dw tells D: My idea, (as he smooths his paper and looks at D),

4.5 W leans over, says to L: ..., (pointing with his pencil, hiding a smile with his hand, then starts drawing). L does not respond. Simultaneously, D tells Dw: Write you' name... (and writes on his own). Dw writes. D says: Dwayne, (pointing to Dw's writing). Dw comments to D, raising hands, palms up, then drops them to table. D says: ...w. (D and Dw then both write). After awhile D looks up quickly at Dw's face, then resumes writing. Dw does not respond.

5.0 L says: Mountain. I saw that mountain. (W looks up at her, says:) Easy. (pause) Mountain. (W taps her hand once lightly with his pencil). Looking at her says, grinning: ...mountain--way up here! (pointing again, resumes own work). L continues to draw without response.

6.0 Dw announces: Finish (probably drawing squares and writing name). (Dw turns paper over). No one responds. W looks twice at L's paper as she continues to draw. He says something to her, then bobs his head and shoulders as he draws, throws hands palms up, leaning back. Immediately resumes drawing, says something to L, leaning over to her paper. L continues to draw. W says: You have to... (W returns to own paper). Pause. L says: I know how to do mine!

6.5 W says something to her again, tapping her forearm, pencil in
hand, then resumes drawing. L continues her drawing. After awhile W looks up at her again, quickly resumes his drawing (I had the impression that he was monitoring her progress and not wanting to waste time himself). W stops, pushes paper towards L, taps pencil on table, says: There's my name (?) right there. (L stops and looks up, says:) Let me try it... (turning her paper over and starting to write). W turns his paper around, orients it to her and taps on it. L starts to write, looking at place he is tapping, says letters.

7.0 W says letter to himself as L writes, then leans over to her, says: Mine is harder 'an yours? (She looks up at him questioningly, their faces close). He exclaims with surprise: Like da-at?! (She pushes herself and leans back, laughing). He leans back and starts to write, then notices t talking (t had been talking some time). W turns paper over. L resumes writing or drawing.

7.5 W, looking toward board where there are letters or words to copy, draws and says: I gon make um mo like dis, Lo'yanne. (She gets up, glances at his paper and leaves the table). As she walks off camera, K lifts her arm up pointing to L, says: You supposed to... (L, startles slightly, says:) What! (and turns around, returns to table). She spreads out her paper, erases. Someone says something. L continues for a moment, then says sharply to S: I don't sit by her, (looking at S). L resumes erasing. Dw says: Up dere, get, (pointing toward board). Resumes drawing. L leans back, laughs, brushes off her paper and says: ...by em!
(Girl from other group standing at table across from L, beside K, says:) Here, I have one good erasal! (Girl reaches out offering her pencil to L). K engages girl in conversation. Girl says: F--0...ah, (writing in the air). t comes and tells her to sit down elsewhere, and she leaves.

8.5 t comes up to table, comments, tells them that they can copy words from up there (board). Leaves. D brushes eraser dust toward Dw's paper. Dw ignores, asks: Did you finish, Wade? (W, erasing, says:) Nope (low voice) (continues working). W looks up at L, asks: You ahead of me? (L replies:) Not, (continues looking at board). W erases. D brushes erasure dust toward Dw again. Dw stops work, unobtrusively blows it back toward D, then brushes his own paper, says something to D. D looks up at him, says something, then looks straight ahead, says something again, resumes writing.

9.5 L says something. W looks up from work, says one word, and then continues working. L says: Sorry. Give up? (W replies loudly:) I guessed right. L finishes, says: Sorry, I'm first. (K says:) If you ansa dat means he love em. (W continues working without looking up). K watches L as she walks around the table with her paper.

10.0 L stands by t who tells them to raise their hands if they are finished. K taps L's shoulder and calls her name. L returns to her seat, ignoring her, and raises her hand. K with her hand up repeatedly calls: Lori! (L looks at own paper, says:) ...I not.... (K says:) ...no tell if you sorry.... L does not respond.
K continues calling L's name until t comes up to look at L's paper.

S says something while looking at own paper, smooths it out and holds it up to show K. K is drawing and doesn't look up.

S says something to K, facing her, then draws. K draws, says: Look the fahy' engine.

S says: ...we gon.... (continues to draw without looking up).

K leans over, lying on top of table, looks at S, says: ...stars.... Dey get stars, yeah?

S replies (?) D looks up at Dw, says: How--how you make dis? (drawing in air with pen).

11.0 t comes up. Dw switches gaze from D to t, resumes work without answering D. t gives direction. t starts collecting pencils from each child. W complains to t: I not finish. I gotta make mountain.

t takes pencil, says: Sorry, time is up.

Other group is coming to sit on floor in front of camera. W says: Need mo lines (looks up at L, grins with embarrassment. L stands and looks at W's paper. He repeats previous statement).

L says: Get lines (and starts to stab at his paper with her finger, but he interposes his hand, palm down, and pats his paper). She stops. S and K stop what they are doing and watch this. During this W appears to be reaching into his coat pocket, first with right, then left hand. Then puts both hands behind his back.

R says to all: Hey, look how many mountains (referring to his
No one attends to R. Boy from another group comes up and looks at R's paper. R does not respond. Then R calls out to Joseph (other group) to look, holding own paper upright. t says from in front of other group: I'm the only one who's supposed to be talking right now.

R puts head down immediately on folded arms, his paper spread out in front of him. Meanwhile L looks at W, says: ...ha ha ha ha. W tells her something, overlapping her laugh. He says this with lips moving but no sound coming out (to avoid t?) She moves away from the table with her paper, then returns, says something to W, while sitting and turning to face t. W says: Yae (nodding head, hands still behind his back). Meanwhile K leans over on top of own paper, head lowered, and close to S says something inaudible to her. W looks over at K, says something to her, face appearing resentful. (Did she say something about him?) S looks at K but does not reply.

t says in loud voice with edge on it: Freeze--where you are! (proceeds to complain about noise in the room). While this is going on L starts to reach for W's paper. He immediately removes right hand from behind back, pulls own paper away. She repeats and he repeats. It has become a contest. Again both repeat. W then leans threateningly toward her and she ducks. Then both watch t as t continues to talk. L then quickly jabs W's paper with her finger while he is watching t. He looks down, notices, and moves his paper away slightly with both
hands. She says something to him, grinning. He leans toward her saying something and she taps his face, definitely but gently, with fingers extended once (a love pat). He shakes his head negatively and she looks away, smiling coyly. t turns toward their table. As she does so both are looking right at her, despite all of the above. She tells all at the table to put their heads down and all do immediately. As their heads are down L continues to talk to W, he watching her intently and where she points. Her head up again, she leans toward him holding a folded paper and what appears to be an envelope (?). She starts to lick it, stops, says to W: Lick this? (then she licks it once).

He waves his hand, palm facing her in a dismissing gesture, then blows at her, first through cupped right hand, then with both hands cupped. She continues folding the paper. During this time D has been worrying about a crumpled piece of paper which he earlier threw to the floor. D now tries to retrieve it. Dw head down notices and watches him, returning his head to table. Then Dw looks at D again, and again returns his head to the table as t tells the other group to put their hands in their laps.

W and L put heads down.

Recitation begins, t asking both groups to tell about their assignment. All have to get a star before they can go out to lunch. Arms go up. Recitation continues. K, L, and R in that order get their stars for answering. W leans over, touches L's
fingers, says: 8, 9 (then adds in whisper, makes dismissing
gesture with hand, palm down). She shakes head negatively while
he nods positively.

16.0 Boy from other group watches R, who is moving own paper. R
says something to him.

S says something to L. L replies, then adds: I'm...on two
sides. W tries to say something to L, but she turned away
from him. L yawns. W leans across table, taps S, tells her:
...get.... (pats pocket of his trousers and points somewhere).
S looks at him, then away, and shakes her head negatively. He
continues speaking and pointing, turning toward L, who is
facing her paper. L writes on own paper, says something to
him, picture is then obscured by t in front of her. W leans
back, then rapidly toward her, shakes his head negatively, and
wrinkles his nose. Then leans farther toward her (teasing
gesture). She then gives him another love pat (see above) on
his cheek.

17.0 In response to this W grabs lapel of own jacket, first left
side, then right, bends over, face inside lapel and pretends
to cry. Dw has been watching the t steadily. He comments to
D, who glances at him, then returns own gaze to t.

W talks to L, still pretending to cry. She slaps his hand and
he repeats the shibai, making audible noise this time.
Dw taps R's shoulder, R looks at him, then back to his own
paper. Dw spreads his own paper out.
While continuing his crying W starts switching his paper back
and forth on the table like it was a tail wagging. L watches him.

S holds up her paper and shows it to W, says something. He leans toward it obscured by t and says something. L tells S something, nodding positively. W turns his paper around, shoves it toward S and says: That's my name. (W holds paper up with one hand before L and continues talking). L looks. S holds own paper up in front of her face and says something, then puts paper down. L glances toward W's face, makes letters in the air. He glances away from her down toward his paper as if checking. S watches, says something. W retrieves his paper and examines it, head bent over. Traces and says something (letters?). L bends over and writes. W straightens up and watches as t gives directions to leave.

18.0 While this is going on K addresses girl from other group: Ama, ama, you Pake?

Girl grins at her and shakes head negatively, hiding her mouth with embarrassment. They exchange remarks, smiling at each other.

(End of Tape)
REFERENCES


Bloom, B.L. The domain of community psychology. Amer. J. community Psychol., 1973, 1, 8-11.


