DOCUMENT RESUME

ED 159 592 CS 003 696

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TITLE KEEP Reading Research: 1972-1975. Technical Report No. 57.
INSTITUTION Kamehameha Schools, Honclulu, Hawaii. Kamehameha Early Education Project.
PUB DATE Feb 76
NOTE 46p.

EDRS PRICE MF-$0.83 HC-$2.06 Plus Postage.
DESCRIPTORS *Beginning Reading; *Creoles; Curriculum Development; Elementary Education; Nonstandard Dialects; *Phonics; *Reading Instruction; *Reading Readiness; *Reading Research; Student Motivation

ABSTRACT

This report presents a summary of reading research conducted by the Kamehameha Early Education Program (KEEP) during 1972-75. Research was conducted in four areas: student industriousness, reading readiness, teaching of sound-symbol relationships, and language (especially dialect interference). With regard to industriousness, it was found that increasing industriousness was a necessary and important factor, although it was not sufficient to produce grade-level reading achievement. Investigations of reading readiness led to the conclusion that a structured and intensive readiness program, which allowed earlier introduction of formal reading instruction, bettered achievement. It was discovered that sound-symbol relationships which are integral to instruction with the phonic methods were not easily learned by KEEP students. After a number of different methods of teaching these correspondences were tried, it was recommended that KEEP students not be taught to read with programs heavily emphasizing phonics. The results of several studies showed that speaking a dialect, Hawaii Creole, probably does not in itself interfere with learning to read at the beginning levels. Finally, a description of the reading curriculum currently being developed is given. (Author)

KEEP Reading Research: 1972-1975

Technical Report #57

Kathryn H. Au

The Kamehameha Early Education Program

a research and development program established and funded by

The Kamehameha Schools/Bernice P. Bishop Estate

Ronald Gallimore, Roland G. Tharp & Gisela E. Speidel,
General Editors

February, 1976

Ellen Antill
Production Editor

The cooperation of the State of Hawaii Department of Education is gratefully acknowledged, as is the support and resources made available by the Sociobehavioral Research Group, MRRC, University of California, Los Angeles.

The opinions expressed herein do not necessarily reflect the position, policy or have the endorsement of The Kamehameha Schools/Bernice P. Bishop Estate, or of the editors.

Published by The Kamehameha Early Education Project, 1850 Makuakane Street, Honolulu, HI 96817

The Kamehameha Early Education Program

The Kamehameha Early Education Program (KEEP) is a research and development program of The Kamehameha Schools/Bernice P. Bishop Estate. The mission of KEEP is the development, demonstration, and dissemination of methods for improving the education of Hawaiian and Part-Hawaiian children. These activities are conducted at the Ka Na'i Pono Research and Demonstration School, and in public classrooms in cooperation with the State Department of Education. KEEP projects and activities involve many aspects of the educational process, including teacher training, curriculum development, and child motivation, language, and cognition. More detailed descriptions of KEEP's history and operations are presented in Technical Reports #1-4.

Technical Report #57

KEEP Reading Research: 1972-1975

Kathryn H. Au

Much of KEEP's effort in research has been in the area of reading. There are several reasons for this. First, success in reading helps to ensure success in all areas of school endeavor. Conversely, failure to learn to read usually signals failure in school. Focusing on efficient ways of teaching reading was important, regardless of what group of children was being studied. Second, the low reading achievement in many of Hawaii's public schools has been a matter of record for a number of years (Honolulu Advertiser, March 1, 1972; Honolulu Star-Bulletin and Advertiser, May 13, 1973). Achievement scores in reading in the public schools as a whole fall below national norms, and furthermore, the lowest scores of all are found in schools in Kalihi and parts of rural Oahu and the Neighbor Islands. Although there are large numbers of part-Hawaiian children in these areas, the problem is better construed as one of socio-economic status, rather than of ethnicity alone.

The existence of a reading problem was already recognized when KEEP first began its operations in 1971, and still continues to be a matter of concern throughout the State (Honolulu Advertiser, January 28 and 29, 1976). In keeping with this concern, the goal of all our efforts in this field continues to be to help all of our students reach grade level achievement in reading, although we realize they must acquire a far greater number of skills in one or two years of school than middle-class children of the same age in order to do so.

Our approach to reading research has been process oriented, rather than product oriented. Specifically, our commitment has been to the empirical examination of problems in reading, with the goal of gaining a better understanding of the variables affecting the child's reading achievement. Our commitment to this process has guided our investigations. Because this is our focus, we delayed our development of a curriculum package, and we did not try to prove the merits of any preselected program. Instead, we have explored many different theories relating to beginning reading instruction and tried to incorporate ideas from different sources.

This report will summarize KEEP's work in reading research by examining studies in four major areas, each of which has a major effect on reading achievement. These areas are:

1) student industriousness,
2) readiness,
3) learning of sound-symbol relationships, and
4) language, specifically dialect interference.

Finally, the new reading curriculum which has grown out of these investigations will be described and directions for future work will be discussed.

Student Industriousness

Before the KEEP students' reading achievement could be increased, the sources of difficulty had to be pinpointed. Island educators frequently mentioned motivation as a major problem (see Technical Report #1). This idea can be elaborated as follows: Unlike many middle-class children, the disadvantaged, part-Hawaiian student does not come from a background where school achievement is highly valued. Thus, the part-Hawaiian child does not learn to read as well as his middle-class peers because this type of accomplishment

is not as important to him; he lacks the motivation to apply himself to learning to read. In our opinion, this idea did not assume a deficit, but only implied a difference. Part-Hawaiian children could learn to work at reading as well as other children, if they were properly motivated to do so (Gallimore, Boggs, and Jordan, 1974; Technical Report #2).

Although a lack of motivation, that is, a lack of industriousness, is a concept many Hawaii educators use to explain the academic difficulties of Hawaiian-American youth, studies of Hawaiian-American culture and behavior suggest the problem is more complicated than a simple deficiency of motives. Gallimore, Boggs, and Jordan (1974) concluded that Hawaiian-American youth are no less motivated to work in general than any other group; in their view the problem was conceived as conflict at the interface of cultures. For many Hawaiian-American children the public school classroom reflects a culture quite different from that in which they are raised. The lack of fit leads to problems which may make it appear that a child is not diligent. Gallimore et al. reviewed a number of studies showing that adjustments in the classroom can produce immediate and substantial increases in Hawaiian industriousness and attentiveness. They concluded from these data that it was inaccurate to describe Hawaiian-Americans as unmotivated in general; rather they are not motivated in some situations. In any event, it is clearly more practical to train teachers to make these adjustments than it is to blame the child or the culture for academic underachievement.

The KEEP approach was based on the assumption that effective classroom management is the best strategy for enhancing motivation--what we call the development of industriousness.

It had previously been found that increasing motivation for children to learn to read had many positive effects on increasing attention to work and

on achievement (Staats, 1968). Studies in this area applied techniques and principles of behavioral analysis, such as those that have most popularly been advocated by Skinner (for example, Holland and Skinner, 1961). One application of this technique to develop academic skills in children was described by Staats (1968). The process has two major steps, the first, a step-by-step analysis of the component skills in the reading task, and the second, systematic reinforcement of the child's correct responses. Using this type of approach, Staats found that students of varying ages and backgrounds, from preschoolers (Staats, Minke, Finley, Wolf, and Brooks, 1964) to a juvenile deliquent (Staats and Butterfield, 1965) made dramatic increases in reading achievement. While Staats' work involved the tutoring of individual students, other investigators worked in the classroom with students' regular teachers. MacDonald and Gallimore (1971) reported studies of two classes of children in local schools who showed improvement in reading behavior as a result of increasing their industriousness. In MacDonald's studies, measures of student attention to the task at hand were used to chart progress.

The strategy, then, was to see if the KEEP students could be brought close to grade level in reading by increasing their motivation. While the convincing results of work in behavior modification influenced the development of this strategy, our approach represented a broader view of the problem. We were not only interested in the effects of positive reinforcement on the children's behavior, but in the relationship of specific behaviors to reading achievement and in the content of the reading curriculum itself.

Industriousness was measured by direct observation of on-task behavior, or how much the students were engaged in appropriate acts. Rate of on-task behavior has been found to be highly correlated with academic achievement, both at KEEP and in other settings. It is easy to see why this should be

the case. A student who is on-task, and paying attention, is more likely to benefit from the teacher's instructions and to complete assignments. This student will learn more and be a higher achiever than an inattentive student who begins with the same level of ability.

Lam, Kidoguchi, Gallimore, Tharp, and Speidel (see Technical Report #6) examined the relationships between the mean observed on-task behavior rates and various measures of socio-economic standing, I.Q., achievement, and rates of correct classroom work for Class I during its kindergarten year. There was a significant correlation between on-task and number of pages correctly completed in learning centers ($r=.61$). Children who were on-task a higher percentage of the time were able later to complete more work than children with lower rates of on-task. The most important finding was a significant correlation between on-task behavior and change in I.Q. for the 11 children who entered school with I.Q.s below 90 ($r=.70$). Similar results were reported by Samuels and Turnure (1974), who found a significant correlation between attention and scores on a word recognition test for their first grade subjects. These findings emphasize the importance of increasing rate of attention, particularly for those children who begin kindergarten with few school-relevent skills.

This approach to motivation or industriousness was first used with Class I in the fall of 1973, when they were entering first grade (see Technical Report #26), and was extended for use with Class II beginning in the spring of 1974 (see Technical Report #42). The plan involved the use of a conventional basal reader program in combination with the best motivational practices that would be easily transferred to a public school classroom (see Technical Report #33). All KEEP teachers developed skill in these practices through an extensive staff training program in behavior analysis, which was designed to raise the

children's motivation to learn in all academic areas. In addition, for the reading program only, a special weekly "reading party" was held to reward the children who showed increased incentive to learn to read. The results would thus indicate whether or not the children's reading achievement could be bolstered by increasing their motivation.

A second, equally important aspect of this plan was the detailed recording of the children's mastery of objectives within the curriculum. Records were kept of how many days of instruction were necessary before a child acquired each new skill. This procedure made it possible to identify problem areas within the curriculum (see section on the learning of sound-symbol relationships).

The program was very successful in maintaining the children's industriousness at a high level. Evidence provided by the on-task (attentional) data showed that the children were highly attentive and demonstrated a high degree of appropriate school behavior in reading class. Informal observations by teachers and research assistants confirmed this finding. The children were observed to be very eager to perform well in reading class. They focused on the teacher and their reading books and were anxious to be called upon to give answers or read aloud. Even the slower learners were well acquainted with the details of the procedure by which they could earn the privilege of attending the reading party. The children all showed a great deal of pleasure and pride when they received reading party invitations. While it cannot be claimed that each and every child was well motivated in reading at all moments, the system described was observed to be immediately effective with the vast majority of children, and eventually to have a motivating effect on every student (Technical Reports #26 and #42).

Still, the children's scores on a standardized test of reading achievement,

the Gates-MacGinitie, were far below grade level in May, despite the fact that they had made steady progress all year. There was a high and significant correlation between achievement test scores and number of basal reader objectives passed, which suggested that accelerating the children's progress through the reading program would boost achievement (see Technical Report #26).

Token Reinforcement Studies

In addition to this long-term study, two shorter studies of diligence were conducted, using the children in the lowest reading group from Class I and II as subjects. These studies made possible a fine-grained analysis of the effects of motivation on reading achievement. They addressed the question of how much more the learning of these poor readers could be augmented through the use of methods designed to increase their motivation. Comparisons were made of the children's learning of sound-symbol relationships and sight words under conditions of token versus no-token reinforcement (see Technical Report #49). Contrary to expectations, neither study showed differences in learning under the two conditions.

These findings generally support the basal reader study. KEEP students have received a great deal of verbal praise and privileges contingent upon attending and correct responding, and can generalize certain appropriate classroom behaviors to other similar settings. Apparently, a concentrated program of reinforcement practices need not continue indefinitely.

Discussion

Increasing motivation to work can have dramatic effects on the reading performance of disadvantaged, part-Hawaiian students (see Technical Report #51). However, even in a setting like the KEEP school, where the children's industriousness was maintained at a high level, grade level reading achievement still was not reached (see Technical Report #36). There is no

doubt that increasing motivation to work does improve reading performance, but not to the extent desired (see Technical Report #26). Even the use of token reinforcement, a very powerful procedure to increase industriousness, did not improve the children's performance when they had reached this level. Therefore, below grade level reading achievement by disadvantaged, part-Hawaiian children could no longer be viewed as resulting from lack of diligence alone. Investigation of other variables was needed to further improve the children's reading achievement.

Reading Consultation

Because the KEEP students regularly receive praise and other forms of contingent reinforcement, they have reached nearly the maximum level of attentional behavior that can be expected of them. Therefore, the importance to reading achievement of practices which maintain high levels of student motivation is better seen in KEEP's consultation projects with the public schools than in the KEEP classrooms. In one project, consultants designed an intervention to accelerate the learning of sound-symbol relationships by poor readers, (kindergarten, first, and second graders) in a Neighbor Island school (see Technical Report #51). The intervention used teaching procedures devised at KEEP in combination with systematic reinforcement in the form of verbal praise and access to coloring pages. The project was well received and well implemented by the classroom teacher. By the end of the study the experimental group had attained the same level of achievement in learning sound-symbol relationships as another group of children who were considered to be progressing well. Furthermore, their rate of correct responding increased significantly over the three sets of letters which were presented. These dramatic gains may in large part be attributed to improvement in the children's motivation to work.

Reading Readiness

In conjunction with studies on the effects of increasing motivation, investigations were also made in the area of reading readiness. Many recent studies in reading readiness have focused on the special needs of disadvantaged children, because these children do not enter school with the same background as middle-class children (Deutsch, 1960).

Differences Between Groups

To gain a more complete picture of some of the differences in reading skills between entering KEEP students and middle-class children of the same age, an individual reading test was devised and administered to the Class III kindergarten and to a kindergarten class at a suburban school. The test was given to both groups when they had been in school less than a month. It covered knowledge of letter names, visual discrimination of letters, and knowledge of initial consonant sounds. Most of the middle-class children already were competent in the first two areas mentioned, and were beginning to develop skills in the third area. Their mean score on the test was 14.03 items correct, out of a possible 42. In contrast, the entering KEEP kindergarteners as a group had almost no skill in any of these areas, as shown by their mean score of 4.82.

This information must be interpreted with care. It does not mean the KEEP students are inherently less capable, only that they do not have the opportunity to develop these reading skills before they enter school. The difference between the middle-class students and the KEEP students demonstrates the need for schools to provide different types of training for different children. While many programs are likely to work in a middle-class school, those that are likely to succeed with students such as those at KEEP will be very few, primarily because of the careful training in a large

number of skills that must be accomplished in a short period of time. (However, some reading programs designed for use with middle-class students might prove successful if used with disadvantaged students at a later age.)

Development of the Readiness Program

Because of these differences between the KEEP and middle-class students, and because our goal was to help the KEEP students reach grade-level reading achievement at the earliest possible date, the need to implement an early reading program was clear. Brzeinski and Elledge (1972) in a review of studies in this area, concluded that there was much evidence to support the use of such programs.

As part of the development of a program of early reading instruction, each succeeding class at KEEP has been placed in an increasingly accelerated kindergarten readiness program. The year long readiness program used with Class I was much like that of the traditional kindergarten, although certain reading readiness materials, including those of Fairbanks and Robinson (1968) and Dubnoff (1969) were used. Class II was in a similar program but with a greater emphasis on the development of attentional and work behaviors. This preparation allowed Class II to begin a formal program of reading instruction by the end of their first semester in kindergarten. In addition, certain readiness activities for use with lower ability children were designed and tested on some of these students (see Technical Report #34).

Students in Class III experienced a more concentrated program of readiness than students in the preceding classes. The readiness period for these children lasted three months and emphasized attentional and work behaviors, in addition to the expected academic skills. Finally, with Class IV, a two month program of readiness was instituted. This new program formalized the use of practices that were shown to be effective with the three other classes,

particularly with Class III.

This readiness program assumes that the focus must be on the specific behaviors that will enable the child to adjust quickly to school and prepare him to meet the demands of learning to read. The strongest feature of this program is that it has identified the many behaviors associated with school adjustment and attention to work and shown that it is possible to teach them. It would no doubt be unnecessary to teach many of these behaviors in middle-class schools, but many KEEP students clearly require and can benefit from specific instruction in these skills.

The readiness program, as incorporated into the new reading curriculum for 1975-76, is divided into three areas: self-help skills, academic skills, and social skills. Examples of self-help skills are: use of a fork and spoon, responsibility for personal belongings, and independent behaviors such as locating appropriate materials. Academic skills include following directions; copying; listening; discriminating between shapes, letters, and numbers; and memorizing nursery rhymes and songs. These skills, like those in self-help are extremely specific and concrete, for example: "being able to sit still and listen to instructions in a group for at least five minutes."

Social skills are also included as an integral part of the readiness program, and again, are stated in terms as specific and concrete as possible. Examples of social skills are: the ability to use the terms "please," "thank you," "excuse me"; to share materials and equipment; to play cooperatively; and to make positive statements about other people. The progress of each student is evaluated at the end of the first two twenty-day periods of instruction. Performance on every objective is checked by individual and group testing or teacher evaluation. A complete list of the objectives in the readiness program and recommended teaching techniques is available.

Effect on Reading Achievement

The development of a more effective readiness curriculum made it possible for formal reading instruction to be introduced at successively earlier times for each KEEP class. The combined effects of the readiness program and beginning reading instruction earlier have unquestionably been a major factor in the improvement in reading achievement between Class I and Class II, Class II and Class III, and very likely between Class III and Class IV. Class I began learning to read at the traditional time, at the start of first grade. Class II began receiving instruction at the beginning of their second semester in kindergarten, a semester earlier than Class I. This second class reached the same level of reading achievement after one and one-half years of reading instruction that Class I reached after two years (see Technical Reports #36 and #42).

To make a more precise comparison of the achievement levels of KEEP classes, differences in these groups, such as I.Q. scores as entering kindergarteners must be considered. Examination of these variables is needed to determine whether differences in performance can be attributed to changes in KEEP's program or to previously existing differences between the groups. For example, the reading achievement of Class II at the end of first grade was higher than the reading achievement of Class I. However, if students in Class II had entered KEEP with higher I.Q.s than students in Class I, the difference in achievement might be attributed to their being a more able group, rather than to improvements in the reading program.

The table below shows the mean total I.Q. (WPPSI) scores of each of the four classes as entering kindergarteners. In fact, there was some fluctuation in I.Q. from class to class. However, the only significant difference in I.Q. is between Class II and Class IV ($t(53)=-2.93$, $p < .02$).

Table 1

I.Q. Scores of Classes at Beginning of Kindergarten Year

	Mean Total I.Q.	N
Class I	90.19	28
Class II	83.81	28
Class III	91.32	28
Class IV	95.74	27

Metropolitan Readiness Tests were also administered to the classes at the beginning of kindergarten. However, the only scores that can be compared are those of Class III and IV, because these two classes were tested within the first two weeks of school, while Class I and II were tested later in the semester. Class III had a mean percentile rank of 7.93, Class IV, a mean percentile rank of 7.62.

Because the four classes have differed somewhat in I.Q., if not in school readiness skills, analyses of covariance were performed to compare achievement levels between the classes. These analyses used entering kindergarten I.Q. (total WPPSI score) as the covariates.

The first analysis compared the reading achievement of Class I and II. The dependent variable was total score on the Gates-MacGinitie reading test administered at the end of first grade. This analysis showed that Class II, despite having lower I.Q. scores, performed at a significantly higher level on this test ($F=14.84$, $n_1 24$, $n_2 28$, $df=1/45$, $p < .01$; Gates mean standard composite score: Class I, $\bar{X}=35.54$, Class II, $\bar{X}=39.61$). The positive effects of the earlier start given Class II are evident; however, the mean score of Class II students on a standardized reading test at the end of the first grade was still somewhat below grade level.

Class III, which began reading instruction after only three months in school, had acquired a greater number of reading skills than Class I or Class II by the end of their kindergarten year. Although no standardized reading test is given in kindergarten, their year-end scores on the Metropolitan Readiness Test and California Test of Mental Maturity showed that their achievement in reading-related skills was at an acceptable level for their age, and for the latter test, higher than the scores of the previous classes at that point (see Technical Report #36).

The achievement levels of Class II and III were compared in an analysis of covariance, using total score on the Metropolitan Readiness Test administered at the end of kindergarten as the dependent variable and entering kindergarten IQ as the covariate. The results showed that Class III scored significantly higher on the Metropolitan than did Class II ($F=4.36$, $n_1=25$, $n_2=28$, $df=1/50$, $p<.05$; adjusted means: Class II, $\bar{Y}=51.14$, Class III, $\bar{Y}=56.34$). Although the results of criterion-referenced tests and teacher reports are the only data currently available for Class IV, the present kindergarten class, it is most likely that this class will reach an even higher level of achievement in reading that Class III.

Discussion

Work with the four KEEP classes demonstrates that a structured, systematic program directly related to desired school behaviors can produce gains in reading during the kindergarten and first grade years. Although follow-up work must be done to determine whether these gains can be sustained, further research and curriculum development in the reading readiness area is important. At present, more work in the readiness area is projected in order to strengthen and broaden the curriculum. It is currently planned to add more objectives in the areas of functional language and cognitive operations to the reading readiness program. Many of the activities in the classroom are already designed to develop

some of these skills, but have not been put into a formal structure.

A similar approach was taken by Karnes, Hodgins, and Teska (1968) who compared a traditional nursery school program with a structured program designed to teach four year olds language and cognitive skills. When the children were tested in kindergarten, the experimental group showed a significantly higher level of achievement in both reading and numbers readiness. Bronfenbrenner (1974) also concluded that systematic preschool programs focusing on cognitive and language development were more effective than other kinds of programs.

Learning of Sound-Symbol Relationships

In addition to investigations in the readiness area, it was also necessary to examine the content of the reading program itself. While the basal reader study was designed primarily to measure the effects of increased motivation on reading achievement, this same study also provided a wealth of detailed information on the rate at which various reading skills were acquired by students in Class I and II. Children in both these classes had more difficulty learning initial consonant sounds than any other skill. Twenty sound-symbol relationships, all initial consonants, were to be learned by the children during their first year. The slowness with which these relationships were mastered probably accounted for much of the lower achievement of these children in reading (see Technical Report #26).

Obviously, the problem is not one that is specific to the KEEP students or only an artifact of the specific reading program used. The study of ways of accelerating beginning readers' learning of sound-symbol relationships is of great importance in primary education in general, because the learning of these relationships, of "phonics," is the basis of many reading programs. Furthermore, the use of reading programs based on systematic phonics instruction

has been widely accepted as one solution to the problem of teaching children to read, with Chall (1967) being the most well known recent advocate of this position.

The learning of sound-symbol relationships may be viewed as a paired-associate task, in this case one in which the child is required to associate a specific sound or phoneme, such as /b/, with a letter or grapheme, b. It has been found that performance on paired-associate tasks is correlated with school achievement (Stevenson, Hale, Klein, and Miller, 1968).

Although there have been a number of experiments investigating variables which influence children's learning in paired-associate tasks (for example, Davidson, Perry, and Baker, 1974), variables which specifically affect the acquisition of sound-symbol relationships by young children have not been widely investigated. More studies like that of Ackerman (1973), which deal directly with variables affecting the learning of sound-symbol relationships, will be needed to answer the many questions arising in this important area. This is particularly true if Feldman, Johnson, and Mast (1972) are correct in contending that the processes involved in performance on paired-associate tasks, and perhaps also in school achievement, are not widely generalizable, and must be considered in terms of specific tasks and the characteristics of different samples of children.

KEEP Studies on the Learning of Sound-Symbol Relationships

All students in Class III, as well as selected students in Class I and II, received instruction through a number of controlled studies to see if ways could be found to accelerate the learning of sound-symbol relationships. This series of largely umpublished studies explored many different variables. In the first

study, the letters to be learned were presented in a constant, or serial order to one group, and in a random order to the other. The way in which the letters were presented, in constant or random order, did not make a difference in either rate of learning or retention.

In the second study, a comparison was made of two different ways of motivating the children. One group received tokens for answering correctly while the other group did not. Again, despite differences in reinforcement procedures, no significant differences in either learning or retention were found between the two groups.

A third study in this area compared the effects of small group instruction versus individual instruction on the learning of sound-symbol relationships. Subjects in the group condition learned faster than subjects in the individual condition on the first two trials. Thereafter the learning rates for the two groups remained the same. Because of the initial differences produced, subjects in the group condition showed a higher level of performance overall (see Technical Report #47).

In a final study, sound-symbol relationships were learned through association with a familiar word that also began with that sound. Thus, when shown the letter b, one group learned first to say "Billy, /b/" in order to establish pairing of the sound and symbol. This experiment was not completed because the subjects' previous experience with learning sound-symbol relationships apparently made it difficult for children in the familiar word condition to learn the associations. This particular study should be replicated with a group of children with no prior experience in learning sound-symbol relationships.

In addition, two studies conducted with preschool students also explored better ways of teaching sound-symbol relationships. The first

study, the recall-recognition study, compared a recall method to a recognition method. In the recall method, the child was shown a letter and required to say the sound that was associated with it. Thus, the experimenter presented the letter s, and the child was taught to respond by saying /s/. In the recognition method, the child was presented with an array of six letters and the experimenter pronounced the sound of one of the letters. The child then was required to point to the letter corresponding to that sound. Thus, if the child heard the experimenter say /s/, he was taught to point to the letter s. The results showed no differences in learning between children who were trained in the recall method and those trained in the recognition method.

The second study, the reversal study, was a continuation of the first. In this experiment children who had been trained in the recall method, as described above, were given a posttest in which they were asked to perform the recognition task. Similarly, children who had received recognition training were given a posttest in which they were asked to perform the recall task. The findings showed that children do have difficulty in reversing the learned associations. Specifically, if a child has learned to respond by saying the correct sound for a given letter (recall), he will not always be able to point to the correct letter when presented with the sound (recognition). In the same way, children trained in the recognition task were not able to transfer their knowledge to the recall task. This finding has implications for classroom teaching. Teachers need to attend to the directions in which they are teaching associations between sounds and letters, whether by a recall method (sound to letter) or by a recognition method (letter to sound), and are well advised to teach the associations in both directions (see Technical Report #48).

Discussion

The conclusions to be drawn from all these studies is that, despite the investigation of many different variables, an entirely satisfactory way of teaching sound-symbol relationships to the KEEP students was not found, and learning of sound-symbol relationships continues to be extremely difficult for them.

The practical implication of these studies is that the KEEP students should not be taught to read with a curriculum that relies heavily on the learning of sound-symbol relationships. The strategy currently being developed starts with the teaching of new words first through an experience approach and by the whole word method. When sound-symbol relationships are taught, children who are experiencing difficulty in learning them will not be held back. Rather, they will be allowed to progress in learning new words through the sight method and in developing comprehension skills.

There are several reasons for deemphasizing phonics instruction, particularly at the beginning levels. First, the KEEP students find it inordinately difficult to learn sound-symbol relationships, as shown by the results of the basal reader study and other studies cited in this section. It is reasonable to assume that this difficulty results from the lack of certain language and cognitive skills which are a necessary basis for efficient learning of sound-symbol relationships. Unlike middle-class students, the KEEP students must develop many of these skills at school. Generally there is not sufficient time for this to happen before the learning of sound-symbol relationships is required, when these occur in the very first stages of the reading curriculum. The KEEP child finds this task extremely difficult at this stage of his development. However, if these sound-symbol relationships are introduced later in the curriculum, after the child has been in school long enough to have gained the necessary language and

cognitive skills, the same problem would not arise.

Fortunately, the learning of words through the sight or whole word method is not nearly as difficult for the KEEP students. Thus it is not necessary to delay the introduction of formal reading instruction if the early steps in the curriculum call for the learning of sight vocabulary, and not sound-symbol relationships. Comprehension skills can also be successfully taught at this level.

Our current hypothesis for the recommended sequence of beginning reading instruction, based on the findings available at the present time, is as follows: First, the use of experience stories to help the children develop concepts of what reading is all about and to acquire some sight vocabulary. Second, the introduction of basal readers or other materials with controlled vocabulary. With both of the above, a strong emphasis on comprehension should be maintained. Third, when adequate reading concepts, sight vocabulary, and comprehension are developed, the introduction of phonics can follow. Children who have superior skills in auditory discrimination and processing could, of course, benefit from an earlier introduction to phonics. However, most children at KEEP do not fall in this category.

A deemphasis on phonics is also supported by the work of Smith (1971) and Thorndike (1973), which suggests that the most important factor in successful reading is teaching children to think or reason. This position implies that the lack of language and cognitive skills, or the ability to think or reason, is at the heart of the reading problem. KEEP's research in this area supports this view, particularly with regard to disadvantaged, minority group children. Further investigation of language and cognitive skills should lead not only to more efficient learning of sound-symbol relationships but to better competence in all areas of reading skill.

Language and Dialect Interference

Findings in the areas of motivation, readiness, and the learning of sound-symbol relationships all suggest that investigations of language should assume a high priority. Perhaps specific language problems or differences were the cause of the low reading achievement of students such as those at KEEP.

Dialect Interference Hypotheses

One of the most widely accepted explanations that has been proposed to account for the problems in learning to read of disadvantaged, minority group children stems from the fact that many of these children are not native speakers of Standard English but grow up speaking a nonstandard dialect. One notion is that general dialect interference, that is, confusion resulting from differences between the child's dialect and Standard English, is a cause of the minority group child's low achievement in reading. Another view is that there is specific interference, and that these sources of interference at the phonological, syntactic, or semantic levels can be identified. While there may be a great deal of overlap between two English language systems, there are also important ways in which the two differ. For example, Baratz (1969) cites differences in the distribution of phonemes and in syntactic rules between Black English and Standard English. She expresses the belief that such differences cause the black child difficulty in learning to read from Standard English texts.

Like black and Chicano children, the KEEP students are native speakers of a dialect, in this case Hawaii Creole. As with Black English, Hawaii Creole has been the subject of linguistic research and also has been shown to be a complex and orderly language (Bickerton, 1973, 1975). Many of the ways in which Creole differs from Standard English have been pinpointed (for example, Peet, 1974), and it seemed reasonable to expect that these differences

could interfere with the KEEP students' learning to read.

Need for Standard English Competence. In examining the classroom situation at KEEP and in Hawaii's public schools, it is obvious that the child must have some level of competence in Standard English in order to learn to read. Although most of the KEEP teachers were born and raised in Hawaii and can speak Creole themselves, they always instruct in Standard English. The children are read stories written in Standard English; they listen to tapes in Standard English; and they watch Standard English television programs. When they are asked to read, it is from Standard English textbooks. While it has always been the practice at KEEP for teachers to accept a child's language regardless of dialect (teachers do not "correct" a child's speech), it is clear that the learning environment requires knowledge of Standard English.

Phonological Interference. One test of the theory of specific dialect interference was at the phonological level. Perhaps misunderstanding was caused by the KEEP students' failure to discriminate certain Standard English phonemes. An example is the /i/ and /iy/ phonemes, as contrasted in the words pill and peel, two words which a speaker of Hawaii Creole might pronounce in the same way, as /piyl/. Smith (1969) stated that confusion would be likely to result if the phonemes of two dialects were so different that a listener experienced great difficulty in classifying what he was hearing in terms of his own phoneme inventory. He hypothesized that this might be the case in a Miami high school, where white teachers were asked to administer a phoneme discrimination test to their black students. Smith interpreted the students' median score of 66% correct as an indication that many were unable to discriminate one-third of the sounds spoken by their teachers.

The search for interference at the phonological level involved testing a sample of Creole-speaking KEEP students on word pairs, such as three and tree, that would be contrasted by a speaker of Standard English but not by a Creole speaker. On the basis of the children's speech it appeared that they did not make such discriminations. However, when the children were asked to listen to a tape of word pairs and to indicate if the words were the same or different, only five discriminations were not made by three or more of the eight children. They apparently recognized differences in the vast majority of word pairs, despite the fact that their speech did not reflect these discriminations. However, a small number of problem contrasts apparently do exist; and relationships have been found between KEEP first graders' inability to make these discriminations and their scores on the Metropolitan Readiness Test (see Technical Report #64). More work in this area is currently being conducted.

Translation Hypothesis. Another way in which dialect might interfere with children's learning to read was described by Baratz (1969). She hypothesized that the black dialect-speaking child went through two steps in the reading process, first, decoding the written words, and second, unlike the middle-class child, "translating" these words into his own dialect. Such a two stage process would clearly impede the child's learning to read. Hall and Turner (1971) also suggested that Black dialect speakers used a translation process, although they described this process as "automatic" and not as a source of difficulty.

Johnson (1975) presented examples of reading responses which would show dialect shift by black students. While the child's response would differ from the exact wording in the Standard English text, based on a knowledge of Black English dialect, it could be shown that he was translating

the text into dialect with no loss of comprehension. Johnson used the following as an example of a multiple dialect shift. The text is given as "He is not smart," which the black child might read as "He ain't no smart." In this example the verb is is omitted, ain't is substituted for not, and no is inserted. However, all of these changes are made in accordance with the structure of Black dialect and no loss of comprehension occurs.

Test for Creole Substitutons. A special oral reading test was designed to test the translation idea, that is, to discover if KEEP second graders would make substitutions or other reading errors showing dialect shift at the point at which the text contained Standard English features which were represented differently in Creole (unpublished study). The children's basal texts were first examined, and sentences which might pose a problem were selected and rated on a three point scale, according to the amount of difficulty the feature in the sentence was likely to present. Sentences used in the study incorporated these problem features, and were similar to those in the texts. The actual sentences which appeared in the text were not presented because it was believed that the children might have memorized some of them. Differences examined were at the phonological, morphological, syntactic, and semantic levels. Surprisingly, it was found that the children made no Creole substitutions, with the possible exception of certain phonological ones. Howeyer, these were very few and could not be reliably scored. Furthermore, the children did not make significantly more errors at the higher difficulty levels than at the lower ones. Neither did any particular item consistently cause the children to hesitate or err in any observable way.

Comprehension of Standard English. It has also been suggested that dialect interference might be operating at the level of comprehension. Perhaps

dialect-speaking children do not learn to read as quickly as Standard English speakers because they are not able to understand the content of the texts they are being asked to read. This would occur largely because of the mismatch between the set of syntactic rules expressed in the child's textbooks and those of his own dialect (Baratz, 1969).

This idea was tested at KEEP at the level of listening comprehension (see Technical Report #53), since it was decided that having the children read Creole texts, something they had never done before, would constitute an unfair test. Stories were selected from the SRA Reading Laboratory and matched according to level of difficulty and content. Children in both Class I and Class II participated in the study. They listened to one set of three stories in Hawaii Creole and one set in Standard English. Following each story, the children were asked to answer five questions. The measure of comprehension was total number of questions answered correctly. It had been anticipated that the children would be able to answer correctly many more questions about the Creole stories than the Standard English stories. However, the study showed no difference in the number of correct responses to the two sets of stories. Apparently, the children were able to understand the Standard English stories as well as the Creole ones. Thus, it is reasonable to assume that they understand their Standard English texts as well as they would similar texts written in Creole.

A similar finding was reported in a study of Hawaiian fifth grade Hawaii Creole speakers. Ciborowski and Choy (1974) compared Creole speakers and Standard English speakers in terms of their ability to recall items from stories in Creole and Standard English. Again, the two groups did not differ except in the poorer performance of Standard English speakers on the dialect stories.

Evidence from KEEP students' results on the Standard English Repetition Test (SERT) and Hawaii Creole English Repetition Test (HCERT) also supports the idea that they are competent in both Standard English and Creole. Both the SERT and the HCERT were administered to Class III in the fall and spring of their kindergarten year. There were significant correlations between sentences repeated correctly on the two tests (fall: $r=.51$, $df=26$, $p<.01$; spring: $r=.66$, $df=26$, $p<.01$). In general, the data show that students who are competent in one code are also competent in the other. Apparently, many of the KEEP students are already bidialectal when they enter school.

This finding is supported by the work of Feldman, Wertsch, Stone, and Frizich (1975), who also used a form of the SERT in studying the Standard English and Creole competence of high school students in Ka'u, Hawaii. They found that subjects' repetition scores on SE items were significantly correlated with their scores on HC items.

Other investigators have reported comparable results in studies with black children. Peisach (1965) conducted a study to find out how successfully information was communicated between teachers and children of different races and socio-economic status, including disadvantaged black students. A cloze procedure was used in which students supplied the missing words in sentences serving as examples of the speech of different social groups. Surprisingly, Peisach found almost no differences between the performance of black and white children, at both the first and fifth grade levels.

Weener (1969) collected language samples from middle-class white and lower-class black adults and used these samples as stimulus materials. The samples were read as word lists to groups of first grade black students and white students. The black children did not recall significantly more from

the lists read to them by adults in their own dialect than from lists read by adults in a different dialect. Weener concluded that at least some dialect-speaking children learn to understand Standard English at a very young age. Nolen (1972) tested second- and fourth grade black and white children of low socio-economic background on materials written in Standard English and Black dialect. Subjects read the selections and then wrote answers to questions. At the second grade level, none of the comparisons between performance of black and white students attained significance. However, white students in the fourth grade outscored blacks on both the two dialect reading passages and on the Standard English passage. Of most interest, perhaps, was the finding that the ability of the subjects to answer questions was not affected by the dialect in which the passage was written.

Proposed Solutions. The main findings in this line of research suggest that two of the most popular solutions to the problem of teaching dialect speakers to read are inappropriate. Neither of these proposed answers (dialect readers, or Standard English drill), is supported by research at KEEP.

The use of dialect readers had been proposed as one solution to the problem of teaching black children to read (Baratz, 1969; Wolfram, 1970). The results of research with the KEEP children indicate that teaching Hawaii Creole speakers to read with Creole texts would probably make no difference at all. Since the KEEP students are bidialectal and can comprehend Standard English as well as Hawaii Creole, the use of Standard English texts cannot be a major cause of their difficulties in reading. Although support for the use of dialect readers by black students continues (Somervill, 1975), the findings at KEEP point out the importance of careful

empirical work in this field. Linguistic research can reveal the rules by which a dialect is governed and can show how these rules differ from those of Standard English. However, the existence of such differences does not mean that they automatically interfere with the child's learning to read.

Clearly, the KEEP students do not need practice in Standard English forms in order to prepare for reading, because the majority are bidialectal or already competent in Standard English when they enter kindergarten. Somervill's (1975) review of studies examining the effect upon reading achievement of programs designed to improve children's capabilities in Standard English also shows that there is no evidence to support such an approach. However, the practice of general functional language skills, which are not specific to any dialect or to Standard Enlgish, may well have a positive influence on reading achievement.

Importance of General Language Ability. While it is almost certain that dialect in itself is not a source of difficulty at the beginning reading levels, the general language ability of the KEEP students and its relationship to learning to read has become a major issue. In language research, the direction now being taken at KEEP is away from an investigation of dialect interference and toward an exploration of aspects of language facility and functional language which are independent of dialect.

The importance of certain language abilities to first grade reading achievement was shown by Bougere (1969). While none of the oral language measures used in her study accounted for as much of the variance in achievement as did the Metropolitan Readiness Test, the addition of certain language measures significantly increased the predictive value of the Metropolitan. The two most important language measures for predicting word recognition achievement were oral vocabulary range and oral vocabulary

diversity, while average length of T-unit (sentence including one or more clauses) was the language measure most highly related to comprehension achievement.

New Directions in Language Research

While KEEP's work in this area has only just begun, it is already apparent that continuing language research offers much promise for improving reading achievement. The issues are extremely complex, since it is impossible to deal with language development without considering underlying cognitive structures.

Some relationships between mothers' use of language and school achievement were shown in a study by Jordan (see Technical Report #61). The mothers of 46 KEEP students participated in this study, which examined the content of mother-child interactions. The experimenter presented the mother and child with a task which had to be performed by both working together. Amounts of verbal, predominatly verbal, predominatly nonverbal, and nonverbal directions by the mother were measured. The results showed a significant positive correlation between amount of verbal and predominantly verbal directions and the children's WPPSI scores as entering kindergarteners. Because I.Q. is a good predictor of school achievement, it was suggested that those children who grow up in an environment where they can become accustomed to learning through verbal direction develop more school-relevant abilities prior to entering kindergarten. These abilities make it easier for them to learn in the school environment, where verbal direction is the dominant mode of instruction.

Au (see Technical Report #50) conducted a study of the oral reading errors of 15 KEEP second graders aimed at identifying reading strategies used by both poor and good readers (poor and good as determined by scores on the Gates-MacGinitie Reading Test). All subjects read the same stories, and tapes of the children's reading were scored by two judges. Errors were placed in

categories grouped according to whether they showed use of context only, use of visual-phonic information only, both, or neither. Using these categories, it was possible to determine if certain patterns of errors could be associated with higher or lower reading achievement and the extent to which the children used visual-phonic or context cues. Errors were analyzed both in terms of number and percent of errors in any one category.

Poor and good readers did show different patterns of errors. Poor readers tended to rely on visual-phonic cues and made significantly more partial identity substitutions and omissions than did good readers. However, the point at which they differed the most was in percent of self-corrections, with good readers frequently correcting their own mistakes and poor readers doing so only rarely. When the error categories were divided into two groups, one including those showing use of context and one including those showing use of visual-phonic information, good readers were found to use context in 71.52% of their errors, poor readers in only 37.58% of their errors. The KEEP students as a group appear to be less proficient in use of context than children who have been the subjects in similar studies in both the mainland U.S. (Weber, 1970) and New Zealand (Clay, 1968).

It appears that the KEEP students do not approach reading as a language task. They do not use fluency in language to aid them in reading, and do not have the idea that trying to solve a problem in reading can be approached by testing linguistic hypotheses.

Pilot studies are also helping to define the problems in the language area more clearly. For example, it might have been thought that the children were largely nonverbal. The results of an unpublished study with a group of KEEP kindergarteners who were selected on the basis of low language ability however, showed that the children are fully capable of making appropriate

statements on a given topic. Another study with first and second graders, all with low scores on both the SERT and HCERT, showed similar results (see Technical Report #59). Children in both studies proved that the KEEP students, even those with the lowest scores on tests of language competence, are able to produce many statements given the proper setting. Similar findings have been reported by Labov (1966) in his work with black children.

Many other questions remain to be answered. Although the KEEP students are bidialectal, they differ from middle-class students in overall language facility and ability to use language, regardless of dialect. It is important to know how the speech of the KEEP students compares to the speech of middle-class students of the same age, particularly in terms of specific measures which have been found to relate to reading achievement, such as those used in Bougere's (1969) investigation. Further investigation is also needed to determine whether the KEEP students are able to use language to help them gain information in a variety of settings. For example, a child should be able to ask questions when he does not understand the teacher's instructions. The ultimate goal of this type of research is to learn about the relative importance of various aspects of language facility and functional language in order to develop curricula and teaching methods to promote the achievement of disadvantaged part-Hawaiian students, particularly in reading.

Research in Cognitive Processes

Closely related to work in language and its functions is the study of cognitive processes. Two studies in this area have been completed to date, both with implications for the teaching of reading.

Gallimore, Lam, and Speidel (see Technical Report #31) conducted a study with KEEP kindergarteners which compared subjects' recall of shape names under three training conditions. The first condition, associative elaboration, was based on the work of Rohwer (1971) and used stories about everyday events, in which

the shape names were linked with common objects (for example, crescent - slice of watermelon). In the second condition, rehearsal, which was derived from Flavell, Beach, and Chinsky (1966), the subjects traced and verbalized the shape name, and then continued to repeat the name until the next shape appeared on the screen. In the third, or control, condition the subjects simply traced each shape and repeated its name. The groups did not differ in number of shapes named correctly on an immediate posttest. However, subjects in the elaboration condition did recall significantly more items on the one-week posttest. The results suggest that the school performance of these children can be enhanced by use of procedures like elaboration, which apparently serve to activate cognitive processes.

Speidel, Hao, and Gallimore (see Technical Report #37) trained a group of KEEP kindergarteners to label the distinctive features of letter-like symbols. For example, the children were taught to say, "This one has a line on top, and this one has a line on the bottom." The control group received no training. The two groups were given a first posttest by an experimenter who had no knowledge of the training given to the subjects. There was no difference in the performance of the two groups on this posttest. The subjects were then given another test by the teacher who had trained the experimental group, but, again, no differences were found. Finally, the trainer gave all the experimental subjects a no-feedback review session with the same stimuli that had been used in training, followed immediately by the test stimuli. This time the experimental group showed a significant increase in performance, compared to both their own previous performance and to the performance of the control group. The authors discussed the results in terms of Flavell et al. (1966) production deficiency hypothesis. This hypothesis states that children pass through a developmental stage in which they do not spontaneously use certain symbolic or cognitive

mediation skills, although they do possess them, The findings of this study suggest that teaching of concepts should be done in a variety of contexts, such as using different methods for presenting the stimuli, having instruction by different teachers, and studying the material in different subject areas. These variations should produce generalization of training. It is also apparent from the results of this study that a child's performance on a test may not provide an accurate assessment of what he actually can do (see Technical Report #37).

New Reading Curriculum for 1975-1976

Our present research in reading is being conducted within the framework of a new reading curriculum which reflects our past work in reading research. Our concern for maintaing the industriousness of the KEEP students is shown in the related staff development program in which all KEEP teachers must participate. Teachers who have not previously received training in behavioral analysis and contingency management are given this background and their application of these techniques to the classroom is monitored. Interventions for children with special motivational and behavioral problems are also managed within the context of the staff development program. It is recognized that lack of motivation to work can be a problem in teaching children to read and thus it is not neglected. However, the findings of the basal reader and two token reinforcement studies showed that increasing industriousness in and of itself was not sufficient to bring the KEEP students to grade level reading achievement.

As mentioned earlier, the new kindergarten curriculum begins with a comprehensive two month readiness program. This readiness program was developed in response to the need for giving the KEEP students an earlier start in learning to read, in order to help them perform at grade level as soon as possible. The readiness program is at present the most detailed part of the curriculum

and calls for the children to master the largest number of objectives for any two month period. The intensive and accelerated nature of the readiness program in the new curriculum reflects the finding that Class II and III both showed increases in reading achievement largely as a result of an earlier introduction of formal reading instruction. As part of the continuing evaluation and improvement of the new curriculum, objectives in the areas of functional communication and cognitive operations are being added to the kindergarten program.

In every section of the new curriculum but readiness, there are three strands, or skill areas: comprehension, sight vocabulary, and decoding. There are also plans to add strands for functional language and cognitive operations. This wide range of skill areas, not all traditionally placed in the reading curriculum, is believed necessary because of the evidence provided by the series of studies on the learning of sound-symbol relationships. These studies led to the general conclusion that a reading program that emphasizes phonics probably presents serious problems for the disadvantaged, part-Hawaiian child. The new curriculum will deemphasize decoding and stress comprehension skills and the learning of words by the sight method as alternatives. Skills in functional language and cognitive operations seem necessary to promote further achievement in the other strands, although more investigation will be needed to determine the exact nature of these skills and their relationship to learning to read.

Finally, the results of studies at KEEP in dialect interference also influenced the new curriculum, although these results generally indicated that our past practices were not inappropriate. Because of our research evidence that the KEEP students are actually bidialectal, they can and are being taught to read with conventional Standard English basal texts under the new curriculum.

Nowhere is there provision for drill in Standard English in the curriculum. However, through the development of objectives in the functional language strand, it is hoped that many opportunities will be presented in the classroom for the children to use language (to increase fluency, to become more elaborative in their language, and to increase cognitive manipulations based on use of more effective language). In this way they may become more proficient in those general language skills which seem more important to learning to read than knowledge of Standard English alone.

The new curriculum, which now provides the basic framework for research in reading, shows our present intent to search for answers within the classroom itself. Close observations of teachers and students, and of teacher-student interactions and student-student interactions will help us to better understand the process by which information is transmitted and applied in the classroom. These observations will help us to specify the variety of methods which constitute good teaching, particularly in reading. We also hope to gain more insight into the ways in which the KEEP students handle different kinds of problems and the process they go through in dealing with different tasks. This understanding will enable us to develop ways of training our students to deal more effectively with similar situations. The new curriculum reflects our belief that research and classroom practice at KEEP should be closely tied together with findings in one area contributing to improvement in the other.

Summary and Conclusions

Even though the problems of successfully teaching reading to disadvantaged, part-Hawaiian children are more complex and subtle than may generally be believed, KEEP has defined problem areas more clearly and has taken positive first steps toward applying these findings in the classroom.

First, it was found that increasing student industriousness was not sufficient

in and of itself to raise the children to grade level achievement in reading. Therefore, while industriousness is always an important factor, lack of it is not the main reason that many disadvantaged, part-Hawaiian children do not learn how to read well.

Second, it was found that the earlier reading instruction is begun, the better the children's reading achievement. Much work was done at KEEP in reading readiness and the optimum time to begin reading instruction. Reading instruction was begun as early as two months after the children entered kindergarten. In order to begin early reading, a comprehensive and intensive readiness program was developed. The present readiness program covers self-help, academic, and social skills and specifies recommended teaching procedures in each area. This program will be further strengthened with the addition of skills in functional language and cognitive operations.

Third, in examining the progress of the KEEP students in a typical reading program, it was found that the learning of sound-symbol relationships was extremely difficult for them. Although a series of studies was conducted which explored ways of accelerating their learning of these relationships, no effective method was found. The continuing difficulty of this type of task for the KEEP students was attributed to the probable lack of certain language and cognitive skills which are necessary prerequisites for the efficient learning of sound-symbol relationships. Further research in the areas of language and cognition is important, not only for the learning of sound-symbol relationships but for reading achievement as a whole. It was also recommended that children like those at KEEP not be taught to read with programs that stress the learning of sound-symbol relationships, especially at the beginning levels. As an alternative, these children should be first taught to read with programs emphasizing comprehension and the learning of words through a sight or whole word method.

Fourth, the results of several studies showed that speaking a dialect, Hawaii Creole, probably does not in itself interfere with learning to read at the beginning levels. Rather, it was concluded that certain lacks in language ability, which are not dialect specific, were contributing to the children's poor progress in learning to read. Based upon this conclusion, investigation in the language area is continuing. Recommendations for future research included investigations to determine the KEEP students' level of skill in specific areas of language facility and functional language, and the relationship of those various skills to learning to read.

Finally, a new reading curriculum was devised based upon the results of past research. It is presently composed of a two month readiness program, and a three strand continuum from kindergarten through third grade. The three strands, or skill areas, are comprehension, sight vocabulary, and decoding, and there are plans to add strands for skills in functional language and cognitive operations. The reading curriculum is also designed as a framework for research and serves to reaffirm the close relationship at KEEP between research and classroom practice.

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