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AUTHOR Fox, Candace; Gallimore, Ronald
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ABSTRACT

This study examines the effects of preschool attendance on school achievement. The achievement test scores of 50 children in two classes of the Kamehameha Early Education Program (KEEP) who had attended preschool were compared to those of their classmates who had not attended preschool. Measures of kindergarten achievement used were the Wechsler Preschool and Primary Scale of Intelligence, the Metropolitan Readiness Test, and the Standard English Repetition Test, administered in the fall and spring of each class's kindergarten year. The Gates-MacGinitie Reading Test, administered in the spring of the first grade year, was used as a measure of first grade reading achievement. It was found that the preschool group had an advantage in verbal ability over the no-preschool group throughout the kindergarten year. However, by the end of first grade, there was no difference in reading achievement between the two groups. Additional analyses on socioeconomic status (SES) variables showed that preschool attenders could not be distinguished from non-preschool attenders on the basis of socioeconomic status. These analyses, however, led to the conclusion that SES is clearly more important to kindergarten achievement than preschool attendance. (Author/JMB)

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

Ellen Antill
Production Editor

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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.

Abstract

A study on the effects of preschool attendance on school achievement is presented. Both parametric and nonparametric analyses were performed on the basis of preschool versus no-preschool attendance; two-thirds of both Class I and Class II made up the preschool group. Measures of kindergarten achievement used were the Wechsler Preschool and Primary Scale of Intelligence, the Metropolitan Readiness Test, and the SERT, administered in the fall and spring of each class's kindergarten year. The Gates-MacGinitie Reading Test, administered in the spring of first and second grade, was used as a measure of first grade reading achievement. It was found that the preschool group had an advantage in verbal ability over the no-preschool group throughout the kindergarten year. However, by the end of first grade, there was no difference in reading achievement between the two groups. Additional analyses on SES variables showed that preschool attenders could not be distinguised from non-preschool attenders on the basis of socioeconomic status. These analyses, however, led to the conclusion that SES is clearly more important to kindergarten achievement than preschool attendance.

Technical Report #65

The Relationship of Preschool Experience and Socioeconomic Status to Kindergarten and First Grade Achievement*

Candace Fox Ronald Gallimore

The effect of preschool experience on later school achievement is a widely debated question (Bronfenbrenner, 1974). Studies have shown that attending preschool has at least some initial impact on achievement, particularly if the program is highly structured and academically oriented (Karnes, Hodgins, and Teska, 1968). This is especially true for disadvantaged children (Ritchie, 1973). However, research is needed to determine the precise nature of the effects of preschool on school success--how meaningful they are and how long-lasting. Since approximately two-thirds of the KEEP children attended a preschool, it was possible to explore this question, using the extensive test data collected on each KEEP student as a part of project research.

We began by trying to assess variations in programming at the 23 different Honolulu preschools which KEEP students previously had attended. Preschools responded to a letter of inquiry with pamphlets or letters describing their programs. A list of the preschools was also presented to a former employee of the Education Research and Development Center at the University of Hawaii. Her previous work on preschool curricula had acquainted her with virtually all of the 23 programs. Based on her experience and our evaluation of the obtained information, it was clear that all programs included academic preparation. Our original assumption of a division into academic, social, and day-care orientations was incorrect. Consequently, the analysis was performed by indexing the

*With contributions by Ellen Antill

children as having (1) attended a preschool or (2) not attended a preschool. The preschools and the number of children who attended each are presented in Table 1.

Table 1

Preschools Attended by KEEP Children

and the Number of Children Attending Each One

Laura Morgan (5)

Kalihi Union (3)

Parent-Child (3)

University of Hawaii (2)
Research Demonstration

Wai-Kahala (1)

Nuuanu Baptist (1)

Central Union & Pali (1)

Kalihi Sunshine (1)

Family Services (8)

Jane S. Parke (3)

KPT (1)

Makiki Na Keiki O Kalihi (1)

Sacred Hearts (1)

St. Elizabeth's (1)

Kahala (1)

Kalihi Baptist (6)

Na Lei (3)

Fort Shafter (2)

Keiki O Ka Aina (2)

Keiki Lei (1)

Keiki O Kalani (1)

Keiki O Lani (1)

Good Shepherd (1)

Results

Forty-three variables were used to compare preschool versus no-preschool. Both parametric and nonparametric statistics were calculated because of small samples and possible skewed distributions. Table 2 lists the results of analysis by the t-test, Kruskal-Wallis, and Mann Whitney U Test. Nineteen variables were significant or approached conventional significance levels. Eight of the nine significant differences involved verbal measures, five from the Fall and three from the Spring testing. Seven of the 10 marginal differences also

Table 2

Comparison of Kindergarten Test Scores of Children
Who Did and Did Not Attend Preschool

		Preschool	No-Preschool	t	K-W	M-U
Fall						
Significant	WPPSI Verbal IQ	89.17 (15.94)	79.47 (20.46)	.030	.04	.02
	WPPSI Information	7.85 (3.05)	6.13 (3.50)	.030	.01	.006
	WPPSI Arithmetic	9.42 (2.32)	7.60 (3.37)	.012	.02	.008
	WPPSI Comprehension	8.08 (3.45)	6.17 (3.73)	.026	.03	.01
	METRO Listening	5.84 (3.74)	3.93 (3.90)	.038	.16	.08
Marginal	WPPSI Similarities	7.58 (3.65)	6.27 (4.13)	.155	.10	.05
	WPPSI Picture Completion	9.50 (2.78)	8.27 (3.22)	.085	.11	.05
	METRO Word Meaning	4.66 (2.40)	3.48 (2.69)	.057	.13	.06
	METRO Numbers	5.82 (3.32)	4.28 (4.11)	.092	NS	NS
Spring						
Sig.	WPPSI Verbal IQ	97.63 (15.90)	88.80 (18.18)	.044	.14	.07
	WPPSI Information	9.79 (.349)	7.32 (3.05)	.033	.02	.008
	WPPSI Vocabulary	9.35 (2.27)	7.92 (2.87)	.035	.14	.07
	WPPSI Mazes	11.08 (2.65)	12.52 (2.86)	.039	.06	.03
Marginal	Exact SERT	13.82 (6.69)	11.52 (6.90)	.158	.18	.09
	HCE Transforms	6.73 (4.19)	8.11 (4.25)	.170	.08	.04
	WPPSI Perf. IQ	106.29 (11.63)	111.08 (18.57)	.250	.18	.09
	WPPSI Similarities	9.42 (3.40)	7.84 (3.94)	.092	NS.	.12
	WPPSI Animal House	10.77 (2.62)	12.20 (3.67)	.090	.09	.05
	METRO Matching	9.06 (3.33)	8.36 (3.74)	.432	.196	.097

involved verbal tests as well. The 24 variables compared and found not different are presented in Table 3.

The findings indicate that preschool has no significant effect on a child's readiness to read, as measured by the Metropolitan Reading Readiness Test (METRO), or on a child's Standard English performance, as measured by the Standard English Repetition Test (SERT) (see Table 3).

However, in the Fall of their kindergarten year, children who attended preschool had some verbal ability advantage over their classmates who had not attended preschool. While all children improved on the testing measures from Fall to Spring, the preschool group retained their advantage in verbal ability. For example, the mean Fall verbal IQ for the preschool group was 89.17 (S.D. 15.94); and for Spring it was 97.63. For the no-preschool group, the mean Fall verbal IQ was 79.47 and in the Spring was 88.80. The preschool group had an average increase of 8.46 points and the no-preschool group had an average increase of 9.33. The disadvantage that the no-preschool children manifested when they entered school was not compensated for by a year of attending kindergarten. Thus, the area where preschool does have an important impact is on the verbal dimension, as indicated by the average ten point higher score on the Verbal WSSPI.

Subtest Analysis

In the Fall, the subtests which contributed to the Verbal IQ difference in favor of preschool attenders were the WPPSI Information, Arithmetic, and Comprehension Subtests (see Table 2). WPPSI Similarities (a verbal measure) and Picture Completion (a performance measure) contributed to marginal differences between the groups (.155 and .085, respectively). In the Spring the preschool group was significantly higher on the WPPSI Information and Vocabulary, both verbal measures (.003 and .035, respectively), and marginally higher on the verbal subtest Similarities (.092). See Table 3 for variables on which there were no significant differences).

Table 3

Variables Which Did Not Produce a Preschool-No-Preschool Difference

WPPSI, SERT, METRO
(t-test)
Classes I, II, III

	Fall		Spring
WPPSI	Full Scale IQ	WPPSI	Full Scale IQ
	Performance IQ		Arithmetic
	Vocabulary		Comprehension
	Animal House		Sentences
	Geometric Design		Picture Completion
	Block Design		Geometric Design
			Block Design
METRO	Matching		
	Alphabet	METRO	Word Meaning
	Copying		Listening
	Percent		Alphabet
			Numbers
SERT	SE correct		Copying
			Percent

On the Performance IQ dimension in the Fall, only Picture Completion is marginally different (.085). By the Spring, Mazes is significantly different (.039), and Animal House is marginally different (.09); both are performance measures. However, it would not be prudent to make much of the few significant differences among performance variables, since they are not frequent enough to make Performance IQ significant in either the Fall or Spring.

First Grade Test Score Comparisons

Multiple statistical analyses were also performed, comparing the Gates-MacGinitie Reading Test and WISC scores for preschool and no-preschool attenders (see Table 4). These tests were given at the end of the first grade year; at this writing, data for two classes (I and II) were available. Only one significant difference was found in favor of preschool attenders: the WISC subtest Arithmetic. Thus, it appears that whatever advantages are enjoyed in

kindergarten are no longer present at the end of first grade for those children who attended preschool. Most importantly, attending preschool did not affect reading achievement.

Table 4

WISC and GATES
First Grade Scores
Classes I, II
(t-Test)

	$\bar{X}$ PRE (N=33)	$\bar{X}$ NO-PRE (N=22)	S.D. PRE	S.D. NO-PRE
Gates Std. Comp.	37.79*	37.14* (t=.845 df=49.9)	13.22	11.18
Gates Vocab. Raw Score	25.88	23.99 (t=.524 df=49.9)	11.57	9.94
Gates Comprehension Raw Score	12.42	14.82 (t=.278 df=40.8)	7.25	8.31
WISC				
Total	101.43	98.35 (t=.475 df=35.1	12.98	15.89
Verbal	97.03	90.80 (t=.181 df=35.1)	13.87	16.97
Performance	106.27	106.99 (t=.856 df=41.5)	14.09	13.77

*All scores N.S.

Preschool Experience and Family Background

While KEEP students come from widely differing family backgrounds (see Technical Report #13), there appears to be no likelihood that more affluent families send their children to preschool more often. In a sample of 71 KEEP children, about two-thirds of both high and low socioeconomic families sent their children to preschool.

Table 5 presents comparisons on various socioeconomic and family indices (a total of 19 variables). There were no significant differences in the family background of preschool attenders and nonattenders.

To demonstrate that there are family background differences within the KEEP population, we also compared the families of children from two distinctly different sample sources in Table 5 (see Technical Report #13 for details). One group consists of families receiving State aid; the other group is composed mainly of intact, nuclear families with relatively higher educational aspirations for their children (reflected by their application to the regular Kamehameha Campus program). In this instance there are important differences (five of 19 variables). The State aid group has a lower income (both total and father's), a shorter length of residence, fewer adult males in the household, and lower mother occupational status. There is no difference in frequency of sending children to preschool.

Family Background and School Achievement

Table 6 presents comparisons on school achievement data for families from the two sample sources from which KEEP has drawn students.

Of the 12 comparisons made on Fall and Spring kindergarten tests, there are seven significant differences by t-test. The State aid subsample scored significantly lower at Fall kindergarten entry on all the WPPSI IQs, the METRO Readiness, and the SERT tests. In Spring of the kindergarten year, the differences between the two subsamples had diminished somewhat; there was no longer a difference in WPPSI IQ. However, significant differences in favor of the Kamehameha Applicant group were obtained on school readiness (METRO) and Standard English facility.

Clearly, family background relates more to test differences in child performance in kindergarten than does preschool attendance.

Table 5

t and p Values, Means, and Standard Deviations for Preschool and Sample Source (KAM/DSS)

SES Measures

	Sample Source						Preschool				
	KAM		DDS		t	p	Yes		No		t
	X	S.D	X	S.D.			X	S.D.	X	S.D.	
Number children in household	3.19	1.52	3.56	1.82	.86		3.52	1.65	3.44	2.04	.19
Number adults in household	5.48	1.33	5.12	2.03	.79		5.33	1.80	5.32	2.08	.01
Length of residence	7.60	5.92	3.92	3.60	3.15	.01	5.29	3.90	4.39	5.51	.78
Family income	13.65	4.77	5.24	2.90	8.01	.01	7.55	5.33	8.13	5.02	.37
Frequency of family gatherings	3.42	.90	3.58	1.31	.54		3.40	1.30	3.65	.94	.84
Closeness of Mother's family	4.39	.75	4.00	1.10	1.56		4.02	1.04	4.35	.89	-1.28
Closeness of Father's family	4.27	1.78	5.19	2.99	1.42		4.54	2.44	5.26	2.73	1.12
Preschool	1.60	.50	1.70	.46	.96		2.00	0.00	1.00	0.00	--
Number adult males in household	1.08	.39	.63	.69	3.03	.01	.83	.60	.78	.67	.32
Percent living in household who always have	93.80	10.94	92.26	9.30	.63		93.54	8.85	91.83	11.66	.69
Mother's comparison to sibs -- household chores	4.15	2.26	3.54	1.24	1.47		3.63	1.59	3.90	1.88	.67
Tasks performed around house	63.31	34.89	64.12	21.73	.119		64.71	27.38	61.91	25.94	.41
TV - time spent watching	9.23	3.95	7.88	3.16	1.56		8.50	3.22	7.90	4.23	.65
Sibling caretaking	21.00	19.72	26.44	18.14	1.17		23.92	17.18	23.70	21.38	.26
Closeness of nuclear family	12.08	2.59	13.00	4.38	.98		12.17	3.82	13.26	3.49	1.16
Mother's occupation	3.88	2.85	1.27	2.47	3.93	.01	2.00	2.84	2.59	2.97	.79
Father's (or mother's boyfriend) occupation	5.67	1.93	11.44	26.54	1.06		9.95	21.77	4.87	2.77	.90
Mother's income	2.39	2.90	2.88	2.78	.54		2.82	2.72	2.00	3.02	.93
Father's income	9.27	3.50	2.00	2.94	5.17	.01	5.24	5.01	5.83	3.70	.31

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Table 6

t and p Values, Means, and Standard Deviations
Sample Source (KAM/DSS)

		Sample Source					
		KAM		DSS		t	p
		$\bar{X}$	S.D.	$\bar{X}$	S.D.		
Fall							
WPPSI	Full	98.69	16.17	87.88	16.94	2.61	.05
	Verbal	92.58	15.50	84.16	17.50	2.02	.05
	Perform.	105.58	16.01	94.30	15.90	2.84	.01
METRO	Percent	23.28	23.18	7.59	12.37	3.59	.01
SERT	SE Correct	12.50	6.12	12.50	5.67	2.09	.05
	HCE Correct	39.96	9.60	36.93	11.05	1.16	
Spring							
WPPSI	Full	108.12	12.74	101.70	14.91	1.78	
	Verbal	100.56	14.97	95.15	17.00	1.31	
	Perform.	114.68	12.02	108.50	13.70	1.85	
METRO	Percent	73.24	12.99	46.92	24.10	5.01	.01
SERT	SE Correct	16.31	6.48	11.98	6.38	2.68	.05
	HCE Correct	43.77	7.69	40.95	10.63	1.17	

Summary and Conclusion

The findings indicate that preschool has an effect, although limited, on the performance of a child in kindergarten, and that the effect mainly is found on verbal dimensions. The preschool group's advantage over the no-preschool group continues throughout the kindergarten year, yet is completely diminished by the first grade year. It appears that preschool gives kindergarten children a slight lead, but it is not a lasting one.

The expectation that SES factors might account for the kindergarten differences between preschool and no-preschool children was not supported by the data. No SES variables were significant on the preschool/no-preschool dimension. The preschool/no-preschool groups were not different according to income, who was head of the household, percent of Hawaiian or non-Hawaiian traits, or any of the other SES items. (This is not surprising since many preschool programs are available in Honolulu for low income families.)

Having eliminated SES factors as a possible selective criterion of preschool attendance, it is possible to assume that any preschool benefits derive from the preschool programs themselves, and the differences cannot be attributed to other factors such as status of families who send their children to preschool.

In terms of the limited measures employed, the lasting advantages of preschool are not evident. Of course, there may be other plausible benefits of preschool which were not assessed. In terms of academic benefits, the KEEP data are not a good test of preschool effects since such a large, and presumably heterogeneous, number of preschools were involved. Until preschools and kindergarten/primary programs are better coordinated, it will not be possible to adequately evaluate preschool benefits.

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