

An English-Language Clinic-Based Literacy Program Is Effective for a Multilingual Population

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ABSTRACT. *Objective.* To assess the effectiveness of a clinic-based pediatric literacy intervention on a multilingual population.

Background. Clinic-based literacy interventions are effective among English- and Spanish-speaking children. No data exist for multilingual populations.

Setting. Pediatric clinic in an urban county hospital.

Design/Methods. Reading practices of 2 cross-sectional groups were assessed by standardized interview before and after the intervention. The intervention consisted of waiting-room volunteers reading to children, literacy counseling, and gift of a children's book at each well-child visit from 6 months to 5 years. Outcomes were assessed separately for primary English-speaking and primary non-English-speaking families.

Results. The baseline ($N = 85$) and postintervention ($N = 95$) groups were similar with respect to child age and sex, parental education, and length of time in the United States. Fourteen languages were represented in total, the most common being English (41%), Somali (28%), Spanish (9%), Vietnamese (7%), Oromo (3%), and Tigrinyan (3%). Compared with baseline, postintervention respondents were more likely to report reading as a favorite activity for the child (10% vs 25%) and parent (18% vs 40%), to read to their child before bed at least weekly (45% vs 71%), and to possess over 10 children's books at home (49% vs 63%). Among English-speaking families ($N = 30$ baseline, $N = 40$ postintervention), weekly bedtime reading increased (63% to 93%), reading as child's favorite activity increased (7% vs 30%), and reading as the parent's favorite activity to do with child increased (33% vs 58%). The proportion of English-speaking families possessing over 10 books at home and those reading with their children at least weekly showed no difference between the baseline and postintervention groups. Among non-English-speaking families ($N = 55$ baseline, $N = 55$ postintervention), weekly bedtime reading increased (36% vs 56%), reading as the parent's favorite activity increased (11% vs 27%), and the number of families to possess >10 children's books in the home increased (31% vs 49%). Reading as child's favorite activity (13% vs 24%) and weekly book sharing (60% vs 76%) showed nonsignificant trends between the non-English-speaking baseline and postintervention groups.

Conclusions. This clinic-based literacy intervention influences home literacy behavior in this multiethnic setting, in both English-speaking and non-English-speaking families. Although efforts should be made to make such programs more appropriate for linguistic minorities, non-English-speaking families do stand to benefit from English-language-oriented programs. *Pediatrics* 2002;109(5). URL: <http://www.pediatrics.org/cgi/content/full/109/5/e76>; *literacy, Reach Out and Read, pediatrics, reading, child development.*

Illiteracy and under-literacy among children is a serious public health problem. Poor school performance can lead to grade retention and school failure. It is well-documented that dropping out of school is, in turn, a risk factor for substance abuse, involvement in violent activity, teen pregnancy, and other poor health practices.¹⁻³ Patients with poor reading ability have difficulty accessing quality health care as well as understanding and following recommended treatments.⁴ Conversely, good early reading skills are associated with positive health, educational, and financial outcomes well into adulthood.⁵ Currently, with the reading level of approximately one half of American adults barely allowing them to integrate and synthesize information from a written text or to fill out a relatively simple form,⁶ effective interventions to promote childhood literacy are important from both education and health standpoints.

Reach Out and Read, a clinic-based literacy intervention, was developed in the early 1990s at Boston City Hospital to address this problem in the health care setting.^{7,8} Building on the concept of emergent literacy,⁹ the program sought to promote literacy among low-income families by fostering reading behaviors among parents and their preliterate infants and toddlers. Since its inception, Reach Out and Read—and programs modeled after it—have blossomed at numerous medical centers across the country.

In recent years, various published studies—including 1 randomized, controlled trial—have demonstrated the effectiveness of such reading interventions.¹⁰⁻¹⁴ Attitudes toward reading and home reading behaviors are positively altered, and there is evidence that language acquisition in toddlerhood is accelerated.^{15,16} The scope of these studies, however, has been limited to English- and Spanish-speaking subjects. To date, no data exist on the efficacy of clinic-based, pediatric literacy interventions among multicultural or multilingual populations.

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Received for publication Sep 25, 2001; accepted Jan 23, 2001.

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Literacy among primary non-English-speaking populations is a particularly complex issue. Methods of language learning and literacy acquisition not only differ between children and adults, but also depend to a large degree on social and cultural factors involving the home, the community, literacy-related traditions of the family's country of origin, and literacy skills in the family's primary language.¹⁷ Because non-English-speaking immigrant and refugee families are an increasing proportion of many clinics' population base, investigation into the effectiveness of clinic-based literacy interventions for these populations is important.

Seattle's Harborview Medical Center houses a pediatric clinic that serves a diverse low-income population, with a large proportion of immigrants and refugees from Asia and Africa. More than 20 languages are represented, of which English and Somali constitute the most widely spoken. The immigrant and refugee population at Harborview varies greatly with respect to time spent in the United States, parental education and literacy levels, and English proficiency—all characteristics that would presumably influence home reading behaviors as well as response to an intervention designed primarily for English-speaking families. In this study, we sought to determine how language and culture modify the effect of this Reach Out and Read-based literacy intervention for our clinic population.

METHODS

Intervention

Our program, modeled after Reach Out and Read, was implemented starting in September 1998. Children and families at the Harborview Children and Teen's Clinic were offered a 3-component literacy intervention. First, they were exposed to waiting-room volunteers modeling age-appropriate reading in English. Second, during health supervision visits, families were given age-appropriate literacy counseling¹⁸ by their primary provider as part of the anticipatory guidance aspect of the visit. Third, at the end of the clinic visit, the child was given an unused, age-appropriate book written in English. The same intervention was offered regardless of the family's native language. The families were given counseling and a book, and were considered participants, even if they chose not to engage with a volunteer reader. All providers at the Children and Teen's Clinic attended a 45-minute training session to learn age-appropriate literacy counseling. The intervention was implemented clinic-wide as a quality improvement project, not as a research study.

Setting

The Harborview Children and Teen's Clinic is an outpatient pediatric clinic housed within Harborview Medical Center, an urban county hospital in downtown Seattle. The clinic receives approximately 12 000 visits a year for both health supervision and acute care. At the time of the study, its providers included 4 nurse practitioners, 3 part-time attending primary care physicians, and 14 continuity clinic pediatrics residents from the University of Washington.

Study Design

Before/after study of 2 cross-sectional groups: the "baseline" preintervention cohort in June 1998; and the "postintervention" cohort in November 1999, after the program had been underway for 14 months. The baseline data were collected by 1 author (L.I.); the postintervention data were collected by another (M.S.).

Subjects

Parents of any child 6 months to 5½ years were approached to participate in the study. There was no attempt, in either the

baseline or postintervention cohort, to recruit a certain number of children of any particular linguistic group. To qualify for the postintervention study, a child must have been seen for well-child care at Harborview Children's Clinic at least once previously. Only 1 child was sampled from each family; in all cases, the eligible sibling with the most recent birthday was selected for study. If a child was accompanied by someone other than his/her regular caregiver or if the child was acutely ill, he/she was considered ineligible.

Data Collection Procedure

Data were collected by standardized questionnaire administered face-to-face to a convenience sample of parents/guardians either before or after the child's visit with his/her provider. Interpreters were used as necessary. Families received no incentive for their participation in the study. Verbal consent was obtained in all cases. In no case was either of the authors collecting data (L.I., M.S.) involved in direct patient care.

Instrument and Variables

The survey comprised 30 items, in which demographic and literacy-related questions were interspersed with questions about play, home activities, bedtime rituals, and television viewing. This was done to disguise the purpose of the study and thereby decrease a social desirability bias in responses. Demographic data included age and nationality of child and caregiver; number of years the caregiver has resided in the United States; highest grade completed by caregiver; location of caregiver's education; primary and secondary languages spoken or understood by the child and caregiver. The child's participation in day care or preschool was also assessed.

Outcome Measures

Outcome measures included the presence or absence of reading as one of the child's favorite activities, or as one of the caregiver's favorite activities to do with the child. These 2 questions were asked in an open-ended fashion (eg, what are your favorite activities to do with your child?). Responses were coded according to preestablished criteria as "reading" and "nonreading." Responses coded as "reading" included only those where the caregiver listed "reading" or "reading books." Literacy-oriented activities such as singing the alphabet or using a computer or speak-and-spell toy were not considered to be reading.

The number of days per week that the caregiver reported reading to the child was assessed, as was the number of days per week that reading was incorporated into the child's bedtime routine. Answers were stratified into 2 categories: at least once per week and less than once per week. Caregivers were asked to estimate the number of children's books in the home, and to comment on ownership and use of a public library card.

Sample Size

A necessary sample size of 57 for each cohort was estimated to provide 80% power to detect a 25% difference in an outcome, the baseline rate of which was 15% ($P = .05$).

Data Analysis

Statistical analyses were conducted using SPSS 10.0 (SPSS Inc, Chicago, IL). Mean values of interval data were compared across groups by using a *t* test for equality of means. χ^2 was used to test nominal and dichotomized data.

The study was approved by the University of Washington Institutional Review Board.

RESULTS

Sample Characteristics

We surveyed 95 children in both the baseline and the postintervention cohorts. Of the 95 baseline subjects, 10 were disqualified from the study because they were discovered to be siblings of other study participants and therefore considered redundant data points. No siblings were identified in the postintervention cohort. Data were thus analyzed for

85 baseline subjects compared with 95 postintervention subjects. No family from either cohort refused to answer a questionnaire. Seven of the 180 subjects included in the analysis were surveyed both before and after the intervention.

Although English and Somali were the most common languages spoken among the 173 different subjects surveyed in both cohorts, no single language constituted a majority (Fig 1). Spanish, Vietnamese, Oromo, Tigrinyan, and Cambodian each also constituted a substantial minority of the study population's language profile. With the exception of the English-speaking population, no single language group comprised a cohort large enough to study on its own, attributable to power limitations.

With respect to demographic and most linguistic characteristics of the aggregate group, the baseline and postintervention groups were similar (Table 1). Slightly more children in the postintervention than baseline group attended day care on a regular basis, 39% versus 32%; this difference, however, was not statistically significant ($P = .32$). English as the child's primary language was slightly more predominant in the postintervention than baseline group, 37% versus 45% ($P = .23$).

When primary English-speaking families were looked at separately, parents in the baseline group completed more grades of school than those in the postintervention group (12.2 vs 11.4; $P = .05$). In addition, more English-speaking children in the postintervention group attended day care on a regular basis than in the baseline group (37% vs 55%; $P = .13$). When primary non-English-speaking families were looked at separately, there were no statistically significant differences between the baseline and postintervention groups with respect to any of the population data. Non-English-speaking parents in the postintervention group tended to have been in the United States slightly longer than those in the baseline group (5.1 years vs 6.2 years); however, this difference was not statistically significant ($P = .17$).

The linguistic profile of all children studied, both baseline and postintervention, is shown in Table 1.

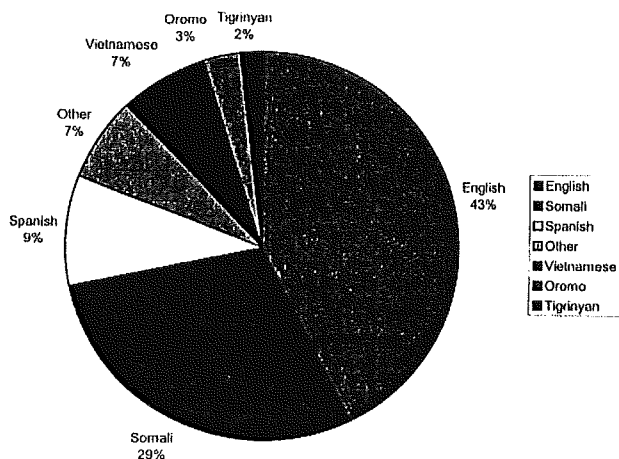


Fig 1. Primary languages spoken at home.

Composite Data

The postintervention group showed significant changes from baseline with respect to many of our outcome measures (Fig 2). Most significantly affected were the caregiver's reports of reading as one of the child's favorite activities (11% vs 26%; $P = .007$), as well as reading as one of the caregiver's own favorite activities to do with the child (19% vs 40%; $P = .002$). The number of families that read to their child at least once a week was increased in the postintervention group, (72% vs 85%; $P = .02$.) Incorporating reading into a bedtime ritual at least once a week was also significantly more common in the postintervention group (42% vs 72%; $P = .0004$). The proportion of families in the postintervention group possessing over 10 children's books at home was also greater than that in the baseline group, to marginal statistical significance (49% vs 63%; $P = .06$).

No significant differences existed between the baseline and postintervention groups with respect to possession and usage of a library card, school preparation activities, or types of toys present in the home.

English-Speaking Subset

The data for this group are shown in Fig 3. In the primary English-speaking group, the number of respondents to report reading as one of the child's favorite activities increased significantly between the baseline and postintervention groups (7% vs 30%; $P = .02$). Similarly, the number of caregivers to report reading as one of their own favorite activities to do with the child increased significantly from the baseline to postintervention group (33% vs 58%; $P = .05$).

Within this group, the number of families that incorporated reading into the child's bedtime routine at least once a week increased significantly in the postintervention group (63% vs 93%; $P = .003$). The number of families that read to their child at least once a week at times other than bedtime did not show a difference (93% vs 98%; $P = .40$), as there was little room for improvement from the high baseline value.

The number of primary English-speaking families to have over 10 children's books in the home was similar in the baseline and postintervention groups (93% vs 98%; $P = .9$).

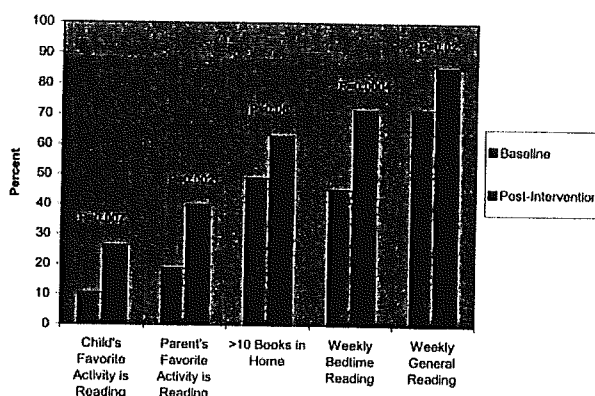
A logistic regression analysis adjusting for day care attendance and parental education level did not substantially change the study results for this group (data not shown).

Non-English-Speaking Subset

Compared with primary English-speaking families, each outcome measure among the primary non-English-speaking families in both the baseline and postintervention cohorts reflected a substantially lower literacy orientation. However, within the primary non-English-speaking group, the intervention appeared just as efficacious as in the primary English-speaking group. The number of non-English-speaking caregivers to report reading as one their favorite activities to do with their child increased

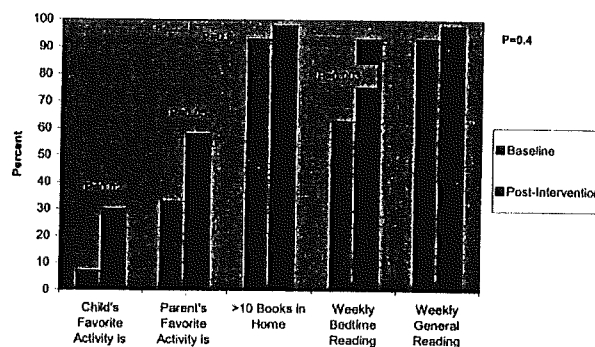
TABLE 1. Demographics of Baseline and Postintervention Cohorts

	Baseline	Postintervention	P Value
Aggregate data			
<i>n</i>	95	95	
Number eligible for study	85	95	
Males	40 (47%)	46 (48%)	.86
Average age (mo)	28.4	28.3	.96
Parent education (grade)	9.2	9.7	.37
Parent time in United States (y)	5.4	6.3	.28
Day care participants	27 (32%)	37 (39%)	.32
Mother as respondent	74 (87%)	81 (85%)	.93
English as parent's primary language	35 (41%)	40 (42%)	.35
Child's primary language			
English	31 (37%)	43 (45%)	.23
Somali	26 (31%)	26 (27%)	
Spanish	10 (12%)	7 (7%)	
Vietnamese	3 (4%)	10 (11%)	
Tigrinyan	4 (5%)	0 (0%)	
Oromo	3 (4%)	2 (2%)	
Cambodian	1 (1%)	2 (2%)	
Other	7 (6%)	5 (6%)	
English-speaking families			
<i>n</i>	30	40	
Males	14 (47%)	20 (50%)	.78
Average age (mo)	27.9	28.9	.83
Parent education (grade)	12.2	11.4	.05
Parent time in United States (y)		(English speakers assumed to live in United States since birth)	
Day care participants	11 (37%)	22 (55%)	.13
Non-English-speaking families			
<i>n</i>	55	55	
Males	26 (47%)	26 (47%)	1.00
Average age (mo)	28.7	27.9	.81
Parent education (grade)	7.7	8.6	.31
Parent time in United States (y)	5.1	6.2	.17
Day care participants	16 (29%)	15 (27%)	.83



P values
 Child's Favorite activity p=.007
 Parent's Favorite activity p=.002
 > 10 Books in Home p=.06
 Weekly Bedtime Reading p=.0004
 Weekly General Reading p=.02

Fig 2. Literacy outcomes at baseline and follow-up.



P values
 Child's Favorite activity p=.02
 Parent's Favorite activity p=.03
 > 10 Books in Home p=.40
 Weekly Bedtime Reading p=.003
 Weekly General Reading p=.40

Fig 3. Literacy outcomes at baseline and follow-up for English-speaking families.

from 11% in baseline group to 27% in postintervention group, $P = .03$ (Fig 4). The number of non-English-speaking families to report reading as one of the child's favorite activities also trended in the positive direction but failed to achieve statistical significance (13% vs 24%; $P = .14$).

Among the non-English-speaking cohort, report of reading practices also showed significant improvement. The number of families that incorporated reading into the child's bedtime routine at least

once a week increased (36% in the baseline group vs 56% in the postintervention group; $P = .04$), as did the number of families that read to their child at least once a week at times other than bedtime (60% in the baseline group vs 76% in the postintervention group; $P = .07$).

The number of non-English-speaking families to have over 10 children's books in the home increased from 31% in the baseline group to 49% in the postintervention group ($P = .05$).

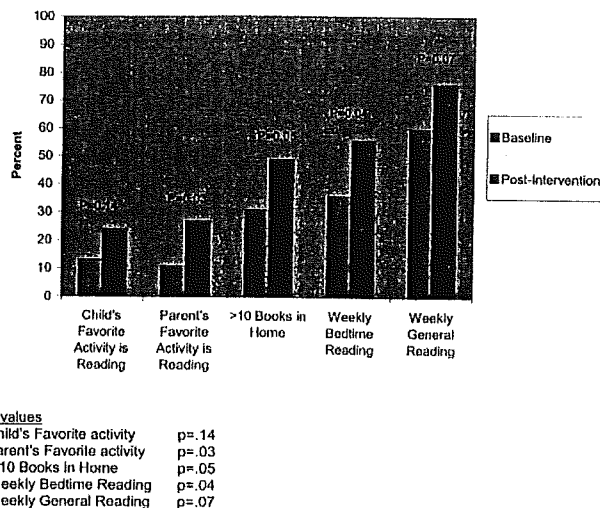


Fig 4. Literacy outcomes at baseline and follow-up for non-English-speaking families.

Within the primary non-English-speaking group, data were also analyzed among subsets based on whether English was spoken as a second or third language. The effects of the intervention among families in which some English was spoken were mildly accentuated when it came to reading as the parent's favorite activity, weekly bedtime reading, and weekly general reading. Conversely, reading as the child's favorite activity and number of books in the home lost significance when looked at among this subset (data not shown). The number of non-English-speaking subjects who reported no facility with English were too few to analyze (data not shown).

A logistic regression analysis adjusting for day care attendance, time spend in the United States, parental education level and location, and presence of English as a second language did not substantially alter the study results for the primary non-English-speaking group (data not shown).

DISCUSSION

Clinic-based literacy interventions are becoming increasingly more common at medical centers serving primarily low-income populations. At present, Reach Out and Read Programs exist in over 1100 sites throughout the United States and Puerto Rico, with an estimated 1.4 million children served annually.¹⁹ Since the program's inception at Boston City Hospital, numerous studies have supported its effectiveness at improving home literacy attitudes and behaviors. There is even evidence that language acquisition among toddlers is accelerated by virtue of exposure to this intervention. Virtually all of these studies, however, have focused on English- or Spanish-speaking populations. Programs, therefore, have been criticized as either culturally biased or potentially ineffective for other ethnic or linguistic groups.

Our goal in this study was to determine whether the program's efficacy could be generalized to immigrant and refugee families of other ethnic origins—an increasing proportion of many urban medical centers' patient base. Such populations face an array of complex issues in acquiring new language

skills. Language learning and literacy acquisition among immigrant and refugee families involves not only the mechanics of grammar, syntax and symbol, but also important social and cultural factors inseparable from the acculturation process as a whole.¹⁷ Literacy acquisition, as one facet of language learning, depends in large part on a family's language and culture of origin. Under-literacy in a first language often portends under-literacy in a second language, irrespective of skills in speaking and listening.²⁰ Similarly, adults and children from cultures rich in the oral tradition may have difficulty with reading and writing but excel in acquiring verbal communication skills. In view of these complexities, it is important that programs like Reach Out and Read be evaluated specifically for their effects on primarily non-English-speaking families.

The results of our study—when all subjects are analyzed together—are consistent with previously published reports supporting the effectiveness of this type of literacy intervention. Our program, like others throughout the country, has a significant influence on parental and child attitudes toward reading, and positively influences the report of home reading practices.

When we stratify study subjects according to linguistic group—that is, separate primary English-speaking from primary non-English-speaking families—positive outcomes persist for both groups. For English-speaking families, reading as both child's and caregiver's favorite activity is enhanced significantly by the intervention. Similarly, the number of English parents who read to their children at least weekly at bedtime increased by approximately 50% between the baseline and postintervention cohorts. For the English-speaking group, those families possessing greater than 10 children's books in the home and those who read to their children at least weekly (at times other than bedtime) were so prevalent in the baseline cohort (both 93%), that to show a statistically significant difference would have required a much larger sample size than was available in our study.

In the primary non-English-speaking group, all outcomes changed in the positive direction. Reading as one of the caregiver's favorite activities to do with the child increased two-fold between the baseline and postintervention cohorts. Weekly bedtime reading in this group increased by approximately 50% between the baseline and postintervention cohorts—the same amount it did among the English group. Reading as one of the child's favorite activities demonstrated a trend toward improvement, but failed to attain statistical significance.

The number of non-English-speaking parents who read to their children at least weekly at times other than bedtime demonstrated a clear trend toward improvement, but failed to attain statistical significance. The most likely explanation for this is a type II sampling error, secondary to the fairly high prevalence of this behavior (60%) already existing in the baseline cohort. Starting from such a baseline, a sample size of greater than 150 would have been neces-

sary for the 15% difference that we showed to attain statistical significance.

The number of non-English-speaking families possessing greater than 10 children's books in the home increased significantly between the baseline and the postintervention cohorts. Although we do believe this to reflect an improved home literacy orientation, this positive effect is likely exaggerated by the low number of children's books that many of these families have at baseline. In addition, the book give-away portion of the intervention was likely responsible for boosting this number over the threshold of 10 for some of these families, independent of the literacy counseling.

Because of sample size limitations, we were unable to determine whether the presence of English as a second language modified the effect of the intervention among primary non-English-speaking families.

Although the magnitude and details of the benefits accrued by our literacy intervention are modified slightly by whether or not English is a family's primary language, its positive effects do seem to transcend linguistic and cultural divides. Why this is so likely relates to the theory of emergent literacy and to the generally accepted thought that preparing to be literate—and by extension, enjoying and using books—involves more than merely understanding the written word. For a 9-month-old, the lure could be associating the warmth of a parent's lap with a book; for a 2-year-old, it could be new vocabulary words associated with bright pictures; for a 5-year-old, the plot; and, for a non-English-speaking parent, perhaps all of the above. In this construct, English language-based literacy programs can indeed hold universal appeal.

Our study was limited by a number of factors. First, our comparative cross-sectional design is prone to inaccuracy in that it compares 2 distinct populations separated in time by an intervention, and therefore does not definitively establish causality. Second, because all study endpoints depend on parental report, our results—particularly the postintervention data—are subject to both recall and social desirability biases. This would presumably bias our results in a direction that would exaggerate the effects of the intervention. In addition, although the survey was standardized, variables uniformly coded, and questions asked in a uniform manner in both the baseline and postintervention waves of data collection, a different investigator performed each collection. Bias could, therefore, have been introduced in this way. Similarly, the use of convenience samples also could have introduced a sampling bias.

With the aforementioned limitations in mind, our study results further support the effectiveness of literacy interventions based on Reach Out and Read, and expand the scope of this efficacy data to linguistically and culturally diverse populations. The data, however, also underline the lower literacy orientation among primarily non-English-speaking families, and therefore the need for accessible, culturally appropriate programs to address this deficit. It remains to be discovered who, among the primarily non-English-speaking population, stands to benefit

most from such programs, and how the presence or absence of facility in English as a second language modifies the program's effect. The effects of pediatric literacy programs on acculturation and parental literacy—as well as investigations into what modifications to these programs would enhance their effectiveness—are also important areas of additional study.

ACKNOWLEDGMENTS

We thank Ellie Graham and Kristina Anderson for their help with this project; Frederick Rivara for his guidance; and Suzanne Silverstein for her insight and expertise in teaching English as a second language.

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