The Effect of Exposure to Reach Out and Read on Shared Reading Behaviors

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Abstract

Background: Caregiver-child shared reading improves literacy skills, school readiness, familial relationships, and social-emotional development. This multiyear study seeks to evaluate the effect of exposure to Reach Out and Read (ROR) on caregiver reading frequency and behaviors.

Methods: Caregivers of children 6 months to 5 years in 427 primary care clinics in North and South Carolina were asked to complete the *Reach Out and Read Parent Feedback Survey*. Caregivers not previously exposed to ROR were categorized as "new," and those who had previously been exposed to ROR as "returning" to compare reading behaviors between groups.

Results: From 2014 to 2019, caregivers completed 100,656 surveys. Returning caregivers were more likely to report reading or looking at books every day (adjusted odds ratio [AOR] = 1.27; 95% confidence interval [95% CI], 1.22–1.33). Returning caregivers were more likely to perform behaviors like letting the child turn pages (AOR = 1.71; 95% CI, 1.62–1.79), making up stories about the pictures (AOR = 1.46; 95% CI, 1.39–1.53), asking what is happening in the pictures (AOR = 1.39; 95% CI, 1.32–1.47), helping identify things in the pictures (AOR = 1.57; 95% CI, 1.50–1.65), reading to the child 30 minutes every day (AOR = 1.39; 95% CI, 1.33–1.46), and taking the child to the library (AOR = 1.26; 95% CI, 1.20–1.34).

Conclusions: This study shows a significant association between caregivers' exposure to ROR, high-frequency reading, and positive reading behaviors, and is consistent for all 6 years studied.

Keywords: literacy; primary care; Reach Out and Read; reading

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What's New

This study demonstrates the effectiveness of the Reach Out and Read model in increasing the frequency of positive reading behaviors when implemented in a noncontrolled clinical environment. It also shows that this effect is consistent over multiple years of observation.

Responsive, reciprocal caregiver-child shared reading supports improved language and literacy skills, school readiness, and social-emotional development and provides a foundation for positive familial routines and relationships.[1]

Recognizing the multitude of lifelong benefits of shared reading for young children and their families, the American Academy of Pediatrics recommends that all pediatric primary care providers promote early literacy during early childhood well-child visits, including advising parents that "reading aloud with young children can enhance parent-child relationships and prepare young minds to learn language and early literacy skills."[2]

Reach Out and Read (ROR) is a family-centric early literacy program whereby medical providers give literacy-based anticipatory guidance to parents and caregivers at each routine well-child visit from at least 6 months to 5 years. During each visit, a developmentally appropriate, engaging picture book is used to evaluate child development, as well as demonstrate and discuss interactive shared reading strategies.[3] Thereafter, the family takes the book home to read together.

The efficacy of the ROR model is supported by extensive peer-reviewed publications that demonstrate positive outcomes related to improved child literacy skills, enhanced parental engagement and frequency in reading with their children, increased well-child visit adherence, and increased book ownership.[4–10] Evidence also shows that incorporating ROR into practices improves clinicians' job satisfaction and

morale, as well as patient-clinician relationships.[10–12] This evidence base was mostly published between the years 1991 to 2012, the 20 years following the first description of the ROR program and generally on study participant numbers less than 256.

In the last 10 years, ROR has expanded rapidly, now reaching 6000 clinics and 33,000 clinicians in all 50 US states, and an infrastructure has been established to ensure quality of delivery of the program through high-quality bulk book sourcing and technical assistance from affiliates that engage locally with clinics. It has become increasingly important to confirm the research findings of the earlier years with more recent data of larger numbers of participants exposed to ROR where the scalability of high-quality delivery of the program is supported by the local ROR infrastructure.

One such opportunity was the institution in 2014 of an annual caregiver survey as ROR expanded into North and South Carolina. Results from this survey collected from 98,451 caregivers during 2014 to 2019 provided an opportunity to evaluate the effect of exposure to ROR on caregiver reading behaviors. This secondary analysis of the survey responses was designed to answer 2 questions exploring the effect of ROR on reading behaviors: 1) Do caregivers with prior exposure to ROR read to their children with greater frequency than caregivers with no prior exposure to ROR? 2) Are caregivers with prior exposure to ROR more likely to engage in shared reading behaviors compared to caregivers with no prior exposure to ROR?

METHODS

STUDY DESIGN

This study is a secondary data analysis using data collected from a large multiyear partnership between ROR-Carolinas and the North Carolina Partnership for Children originally designed to evaluate the effect of exposure to ROR on caregiver reading behaviors.

Participating clinics were instructed to invite all caregivers of children, 6 months to 5 years of age, receiving a well visit to complete the *Reach Out and Read Parent Feedback Survey* in either English or Spanish. Caregivers were approached and asked to complete the survey at the end of the well visit and before they left the clinic. Clinics were given the flexibility to incorporate the data collection into their own patient flow and logistical systems (eg, before caregivers left the exam room or at checkout). While most caregivers completed the survey on their own, clinic staff were given the option of reading the questions to caregivers upon request. The number of surveys completed with support from clinic staff is unknown; however, it was believed to be small. Caregiver participation was voluntary, and there were no incentives for completion of the survey. Clinics did not record the number of surveys they distributed; therefore, the completion/response rate is unknown.

Data were collected annually during a specific 6-week period either in the fall or the spring. Clinics were allowed to stop collecting surveys before the end of the 6-week period if a minimum of 200 surveys had been completed. All surveys were completed anonymously on paper. Because data were collected over a period of 6 years, participants in any clinic could have responded more than once.

The secondary data analysis performed in this study was awarded exempt status from the University of Oklahoma Health Sciences Institutional Review Board.

STUDY POPULATION

The study population included caregivers of children ages 6 months to 5 years old receiving a well visit at a site in which ROR was fully implemented, in the US states of North or South Carolina during the period of 2014 to 2019. Participating sites included academic, private, and health department clinics. Both pediatric and family medicine sites were included. As ROR implementation across North and South Carolina increased, new sites were added to the study. Only sites fully implementing were surveyed. For this reason, not all sites contributed surveys for all years. In most of these clinics, at least 35% of patients were covered by Medicaid or nonprivate insurance. Participating sites included 267 clinics spread across 84% of North Carolina counties and 160 clinics covering 98% of South Carolina counties. In each clinic, a primary care provider served as the medical champion of the program, and trained providers integrated ROR into their standard care of young children.

STUDY MEASURES

Study measures were derived from responses to the *Reach Out and Read Parent Feedback Survey* (a modification of surveys developed for quality improvement within the ROR network). Because the survey was intended to be self-administered, it was written for adults reading English at a third-grade level. The English version of the survey scored 86.4 on Flesch Reading Ease, which is in the "easy to read" range. This version of the survey was translated into Spanish. The number of questions was limited to those that would fit on one side of one page.

Study measures were developed to answer 2 main questions previously stated above. 1) Do caregivers with prior exposure to ROR read to their children with greater frequency than caregivers with no prior exposure to ROR? 2) Are caregivers with prior exposure to ROR more likely to engage in shared reading behaviors compared to caregivers with no prior exposure to ROR?

Prior exposure to ROR is considered the primary predictor for both study questions and was determined from the survey question, "Is this the first time this child has received a book at the doctor's office?" A "Yes" response indicated that they had not previously been exposed to ROR and they were categorized as "New"; a "No" response indicated that they had been exposed to ROR previously and they were categorized as "returning"; and an "I don't know" response resulted in exclusion from the analysis.

The outcome of interest for question one is the reported frequency of reading. Caregivers were asked, "About how often do you read or look at books with this child?" Response options included "Never," "Several times a year," Several times a month," "Once a week," "Several times a week," or "Every day." The frequency of reading was recoded into a binary variable with categories "Every day" and "Less than every day." This variable was dichotomized to reflect adherence to the ROR recommendation to read to children every day. The outcome of interest for question 2 is the utilization of shared reading behaviors. To ascertain shared reading behaviors at the time the survey was completed, caregivers were given a selection of 6 commonly recommended reading activities, including letting the child turn the pages, making up stories about the pictures, asking the child what's happening in the pictures, identifying things in the pictures, reading for at least 30 minutes every day, and taking the child to the library. They were asked, "Do you think you will try any of these reading activities with this child?" For each activity, they could respond "Yes, I will try this," "Maybe, I might try this," "No, I don't think so," or "I already do this." To investigate the differences in reading behaviors between new and returning caregivers, responses were categorized into the binary variable "I already do this" versus any other response ("Yes, I will try this," "Maybe, I might try this," and "No I don't think so").

STUDY ANALYSIS

Differences in reading frequency and reported behaviors between new and returning caregivers were analyzed using logistic regression odds ratios, defining statistical significance as 95% confidence intervals (95% CIs) not overlapping a value of 1. Missing values were excluded from models. All odds ratio estimates are adjusted for the site at which the visit took place, age of child, insurance status, caregiver education, and survey language. Generalized estimating equations were used to adjust for within-clinic correlation. Stratified models have also been produced to explore the potential for the difference in observed associations by age group. All analyses were completed using SAS 9.4.

RESULTS

From 2014 to 2019, caregivers in 427 primary care clinics completed 98,451 surveys. Of the 98,214 surveys containing responses on whether the visit was the first time the child has received a book, 31.4% responded "Yes," indicating that they had not been exposed to ROR previously and were categorized as "New" caregivers, 64.9% responded "No," indicating that they had been exposed to ROR previously and were categorized as "returning caregivers," and 3.7% responded "I don't know" and were excluded from the analysis (Tables 1 and 2). In an analysis of behavioral differences between new and returning caregivers, returning caregivers were significantly more likely than new caregivers to report reading or looking at books every day with their child (adjusted odds ratio [AOR] = 1.27; 95% CI, 1.22–1.33). Returning caregivers were significantly more likely than new caregivers to respond that they performed shared reading behaviors like letting the child turn the pages (AOR = 1.71; 95% CI, 1.62–1.79), making up stories about what is happening in the pictures (AOR = 1.46; 95% CI, 1.39–1.53), asking the child what is happening in the pictures (AOR = 1.39; 95% CI, 1.32–1.47), helping the child identify things in the pictures (AOR = 1.57; 95% CI, 1.50–1.65), reading to the child at least 30 minutes every day (AOR = 1.39; 95% CI, 1.33–1.46), and taking the child to the library (AOR = 1.26; 95% CI, 1.20–1.34). Statistically significant results remained after stratifying by individual years 2014 to 2019 (Tables 3 and 4) with the exception of the association between new versus returning caregiver and taking the child to the library in 2014. Stratifying by age produces some results suggestive of differences in the magnitude of observed associations between age groups (Supplementary Table 5). For the association between prior exposure to ROR and reading frequency, the 6- to 12-month age group and the 1- to 2-year age group show the largest AORs compared to the 3- to 5-year group. However, for the association between prior exposure to ROR and participating in reading behaviors, the 6- to 12-month age group showed the largest AORs for all 6 reading behaviors.

DISCUSSION

This study demonstrates that delivery of the ROR model effectively encourages caregivers to read together with their young children regularly using strategies that promote positive caregiver-child interactions. This provides evidence for the ROR program's sustained impact over 6 years in a real-world situation where ROR has been scaled to 427 clinics that are diverse in location and type and high-quality delivery of the program is supported by the local ROR infrastructure.

Caregivers previously exposed to ROR were significantly more likely to report reading to their child every day and significantly more likely to report performing positive behaviors associated with reading to their child compared to caregivers with no previous exposure to ROR.

These results reinforce and extend the findings of previous studies that caregiver exposure to ROR is associated with an increased likelihood of reading to their young children.[5–9,13,14]

The demonstration that ROR has a positive effect on caregivers engaging in activities around the book that foster more caregiver-child interaction is particularly important given the release in 2021 of the American Academy of Pediatrics policy statement *Preventing Childhood Toxic Stress: Partnering With Families and Communities to Promote Relational Health.* This statement highlights that positive childhood experiences can

Table 1. Demographics by New Versus Returning Caregiver Status and Chi-Square *P* Value

	New (N = 30,883)		Returning (N = 63,712)		*P* Value
	n	%	n	%	
How old is the child who had a check-up today?					< .0001
6–12 mo	14,019	45.4	12,549	19.7	
1–2 y	8150	26.4	29,821	46.8	
3–5 y	8714	28.2	21,342	33.5	
What type of health insurance does this child have?					< .0001
None	912	3.0	1124	1.8	
Medicaid	21,129	69.3	42,229	67.0	
TRICARE/military	1257	4.1	2550	4.0	
Private insurance	6964	22.8	16,796	26.7	
I don't know	234	0.8	335	0.5	
What is the highest level of education or schooling you have completed?					< .0001
Less than high school	3146	10.4	4915	7.9	
High school/General Educational Development (GED)	10,739	35.6	20,939	33.5	
Some college/vocational training	9748	32.3	21,575	34.5	
4-Year college degree or higher	6510	21.6	15,138	24.2	
Survey language					< .0001
Spanish	3516	11.4	5845	9.2	
English	27,367	88.6	57,867	90.8	
Survey year					< .0001
2014	2659	8.6	4865	7.6	
2015	3178	10.3	5697	8.9	
2016	3693	12.0	6576	10.3	
2017	5489	17.8	10,913	17.1	
2018	8948	29.0	17,264	27.1	
2019	6916	22.4	18,397	28.9	

Table 2. ROR Model Questions by New Versus Returning Caregiver Status and Chi-Square *P* Value

	New (N = 30,883)		Returning (N = 63,712)		*P* Value
	n	%	n	%	
Did the child receive a book during today's visit?					.01
Yes	29,936	97.1	61,420	96.8	
No	892	2.9	2030	3.2	
Did the medical provider talk to you about reading or looking at books with the child?					< .0001
Yes	27,696	90.3	58,946	93.1	
No	2974	9.7	4361	6.9	

mitigate adverse childhood experiences and advocates for a public health approach to toxic stress. Our results strengthen the evidence for the statement's citation that ROR is a primary universal prevention intervention.[15]

Delivery of an early literacy program such as ROR through pediatric primary care has the potential for near-universal and equitable access to families with infants, toddlers, and preschoolers,[16] as was the case with the families served in this project. Our study provides evidence to support the position that implementation of ROR as a standard of care is a successful means of equitably providing a foundation for early childhood development and long-term health and well-being.

Given the nature of real-world data collection, this research is not without limitations. Firstly, there is no true pre-post longitudinal analysis. Not all clinics contributed data for all years assessed and completion rates could not be calculated and were likely not equal across all clinics. Furthermore, because the survey was anonymous and was disseminated multiple times, it is possible that some caregivers could have completed the survey multiple times.

There are some limitations specific to our predictor variable. Using a negative response to categorize prior exposure to ROR (answering "No" to whether this was the first time the child received a book at a doctor's office) introduces some uncertainty surrounding the accuracy of categorization. However, after creating and testing several iterations of this question, the survey design team concluded that this question was the easiest for caregivers to read and interpret. We also included "I don't know" as a survey response option to attenuate the misclassification of those unable to recall their previous experiences with ROR. Even still, there is likely some misclassification of the predictor variable. Some caregivers answering that this is the first time they have received a book at the

Table 3. Percent of Returning Caregivers Versus New Caregivers by Year

	Returning %, New %						
	2014	2015	2016	2017	2018	2019	All Years
About how often do you read or look at books with this child? (Percent responding "Every day")	46.9, 41.3	50.1, 46.7	46.5, 43.3	42.7, 40.4	41.4, 37.8	43.3, 34.4	43.8, 39.5
Do you think you will try any of these reading activities with this child? (Percent responding "I already do this")							
Let the child turn the pages	61.0, 45.5	62.6, 44.7	64.5, 44.6	65.6, 44.5	62.2, 42.5	60.9, 38.9	62.6, 42.8
Makeup stories about what is happening in the pictures	48.9, 37.2	51.7, 36.7	52.3, 36.7	52.2, 37.8	50.0, 36.2	49.5, 34.0	50.5, 36.2
Ask the child to tell you what is happening in the pictures	42.4, 32.2	44.7, 32.0	44.6, 30.9	46.2, 33.1	43.7, 30.8	42.3, 27.3	43.8, 30.7
Help the child to identify shapes, colors, numbers, letters, or things in the pictures	59.4, 44.7	61.0, 44.7	62.9, 43.8	63.6, 45.7	61.0, 43.6	59.7, 40.2	61.1, 43.4
Read to the child at least 30 min every day; for example, during meals or baths, before naps or bedtime	46.5, 36.2	49.2, 36.2	47.4, 35.0	48.8, 36.1	46.0, 34.3	46.1, 32.7	47.0, 34.7
Take the child to the library	28.3, 22.8	29.3, 21.2	29.3, 20.9	29.5, 21.9	29.0, 21.7	28.8, 19.4	29.0, 21.1

Table 4. Adjusted Odds Ratios by Year Comparing Responses Between Returning Caregivers Versus New Caregivers, Adjusted for Patient Age, Health Insurance, Caretaker Education, Primary Language, and Clinic

	Adjusted Odds Ratio (95% Confidence Interval)						
	2014	2015	2016	2017	2018	2019	All Years
About how often do you read or look at books with this child? (Percent responding "Every day")	1.29 (1.12–1.48)	1.29 (1.12–1.49)	1.22 (1.10–1.36)	1.25 (1.15–1.36)	1.34 (1.23–1.45)	1.38 (1.27–1.50)	1.27 (1.22–1.33)
Do you think you will try any of these reading activities with this child? (Percent responding "I already do this")							
Let the child turn the pages	1.43 (1.25–1.64)	1.64 (1.45–1.86)	1.80 (1.58–2.04)	1.77 (1.60–1.97)	1.77 (1.63–1.92)	1.74 (1.58–1.92)	1.71 (1.62–1.79)
Makeup stories about what is happening in the pictures	1.31 (1.18–1.47)	1.57 (1.41–1.75)	1.59 (1.42–1.78)	1.46 (1.32–1.61)	1.47 (1.37–1.57)	1.41 (1.28–1.54)	1.46 (1.39–1.53)
Ask the child to tell you what is happening in the pictures	1.29 (1.14–1.46)	1.45 (1.25–1.68)	1.47 (1.27–1.70)	1.35 (1.22–1.49)	1.43 (1.32–1.55)	1.40 (1.26–1.57)	1.39 (1.32–1.47)
Help the child to identify shapes, colors, numbers, letters, or things in the pictures	1.36 (1.17–1.59)	1.55 (1.37–1.75)	1.69 (1.49–1.91)	1.56 (1.41–1.71)	1.62 (1.50–1.75)	1.58 (1.43–1.73)	1.57 (1.50–1.65)
Read to the child at least 30 min every day; for example, during meals or baths, before naps or bedtime	1.24 (1.11–1.39)	1.48 (1.30–1.69)	1.40 (1.23–1.58)	1.42 (1.29–1.56)	1.42 (1.32–1.54)	1.37 (1.25–1.51)	1.39 (1.33–1.46)
Take the child to the library	1.11 (0.96–1.28)	1.35 (1.17–1.55)	1.33 (1.17–1.52)	1.29 (1.16–1.43)	1.25 (1.14–1.37)	1.30 (1.17–1.44)	1.26 (1.19–1.34)

doctor's office could have received a book from a visit to a separate clinic and would have thusly been misclassified as unexposed. Caregivers could have forgotten their receipt of a book in a previous visit and would thusly be misclassified as unexposed. It should also be noted that the associations were the greatest for caregivers with children 6 to 12 months old. At the time the study was implemented, the ROR intervention began at the 6-month well visit; thus, the findings of significant differences in the 6- to 12-month time period where it is likely that the unexposed were truly unexposed due to the fact that families were first coming into contact with the ROR intervention and time between visits was short leading to less recall bias improve the reliability of group classification and strengthen our findings.

There is also the possibility that those truly unexposed were classified as exposed. The question of whether this was the first time the caregiver received a book does not comment on other fidelity to the ROR model. Even if the caregiver has received a book in a prior visit, that may have been the only portion of the ROR intervention that was received. We are considering this as being exposed to ROR; however, we have not assessed to what extent they were exposed (did they receive anticipatory guidance, or was shared reading modeled by the provider). There is also a possibility of response bias, but we are not concerned given the variation and relatively low proportion responding favorably to performing behaviors listed. For example, the proportion of caregivers reporting taking their child to the library was smaller than the proportion of caregivers reporting participating in any other behavior of interest. This strengthens the reliability of our data, demonstrating that caregivers were not simply answering that they will try all behaviors listed. Lastly, there is a possibility for participation bias at both the clinic and patient levels. However, we believe the ability to statistically control for variation in clinics and patient demographics helps address this, as well as the large sample size taken from varying locations and the consistency of the results across time, all help to address other listed limitations above and contribute toward generalizability.

Following this study, there are several avenues of ongoing research to further strengthen the ROR evidence base, including analysis of which elements of ROR are critical for effectiveness, and investigation into whether influencing reading behaviors in real-world situations ultimately leads to improved early childhood development including language and literacy, and social-emotional skills. The results from this study also suggest that the association between exposure to ROR and reading behaviors may be different between age groups. We, therefore, believe that potentially productive future research includes a more directed investigation of the associations between ROR and reading behaviors among different age groups.

Conclusions

This study used up-to-date, large-scale data over several years to validate the effect of exposure to ROR on caregivers' increased shared reading with their young children and also on their use of specific reading strategies that promote positive caregiver-child interactions.

In demonstrating the sustained effectiveness of ROR as it was scaled across the US states of North and South Carolina and supported by the ROR local infrastructure, outside of a controlled study environment, the evidence supports the integration of ROR as a standard of pediatric primary care from a clinic, a policy, and a funding perspective.

Declaration of Competing Interest

Callee Boulware, Carolyn Merrifield, Teandra Ramos-Hardy, and Nikki Shearman are employed by Reach Out and Read.

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Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.acap.2023.06.030.

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