Early Childhood Research Quarterly xxx (2018) xxx–xxx

Contents lists available at ScienceDirect

Early Childhood Research Quarterly

Encouraging parent–child book sharing: Potential additive benefits of literacy promotion in health care and the community

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ARTICLE INFO

Article history:
Received 1 March 2018
Received in revised form 2 November 2018
Accepted 13 November 2018
Available online xxx

Keywords:
Language
Disparities
Bookreading

ABSTRACT

Children from low-income families are more likely than their higher income peers to show delays in language and literacy skills, both at school entry and across the lifespan. Programs aimed at promoting language and literacy activities in the home, particularly programs that combine distribution of print materials with support and guidance for using them, have been effective in decreasing the word gap, leading to increased school readiness and early literacy. The current study examined the impact of such a program based in pediatric healthcare, Reach Out and Read (ROR), on parents' use of community resources that also provide access to print—namely, the public library—in the context of a citywide initiative to link literacy resources for low-income families. Effects of both ROR and the library, both individually and combined, on parents' literacy activities at home were then examined. Significant associations between receiving ROR, using the public library, and parent–child book sharing were found. Implications for intervention and policy are discussed.

1. Introduction

A disproportionate number of children with low language and literacy skills come from low-income backgrounds (Duncan & Brooks-Gunn, 2000), and a large body of evidence has indicated that the number of words these children hear in infancy and toddlerhood, the complexity of those words and phrases, and the presence of back-and forth responses between young children and their caregivers all contribute to such disparities (Hoff, 2003; Hoff & Naigles, 2002; Tamis-LeMonda, Kuchirko, & Song, 2014). Thus, interventions aimed at reducing achievement gaps between low- and higher-income children have often focused on encouraging parental talk through parent-child interaction (Landry, Smith, & Swank, 2006; Mendelsohn, Huberman et al., 2011; Molina, 2017). One promising avenue for such interventions is promotion of parental reading aloud and parent–child book sharing. Mothers tend to talk more when reading with their children than in other situations (Crain-Thoreson, Dahlin, & Powell, 2001; DeBaryshe, 1993; Fletcher & Reese, 2005; Hoff-Ginsberg, 1991), and early experience with books, as well as hearing songs and stories, naming objects and pictures, and engaging in conversation all contribute to early literacy (Zero to Three, 2003). Such early literacy experiences in the home are particularly important during infancy and early toddlerhood because they take advantage of early brain plasticity, building neuronal connections that enable later reading and academic success (Shore, 1997; Snow & Tabors, 1996). They also build routines around literacy activities and encourage reading and writing skills as children grow (Sénéchal, Cornell, & Broda, 1995; Sénéchal & LeFevre, 2002). Further, fostering early language and literacy skills has lifelong benefits for both individuals and society, as they are linked to high school completion rates, adult employment, crime, and poverty, as well as physical health status across the lifespan (Campbell & Pungello, 2008; Nores & Barnett, 2016; Reynolds, Temple, Ou, Arteaga, & White, 2011). However, low-income parents, on average, read to their children less frequently and for shorter durations (Hoff, 2003).

Access to literacy materials and available time are both barriers to parent–child book sharing among low-income

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https://doi.org/10.1016/j.ecresq.2018.11.002
0885-2006/

families—mediators that have often been classified as comprising an investment pathway from family income to children's outcomes (Conger, Conger, & Martin, 2010; Yeung, Linver, & Brooks-Gunn, 2002). This model posits that poverty leads to limited resources (Constantino, 2005; Rijlaarsdam et al., 2013), such as those mentioned above, which in turn lead to fewer language- and literacy-rich interactions, and ultimately to achievement gaps in children. Numerous studies have examined impacts of such investment limitations, and many interventions aimed at closing the word gap through promotion of parent–child book sharing have focused on this pathway. For instance, Neuman and Celano (2001) and Neuman and Moland (2016) have argued that income segregation has led to the creation of "book deserts." These are areas, especially concentrated in low-income communities, in which there is little or no access to print resources—that is, there are no bookstores, and other resources that provide children's reading material are limited. Book flooding programs, which provide a large number of books to families, classrooms, and other programs, have been shown to increase access, and are related to improvements in preliteracy and emergent literacy skills, such as concepts of print, writing and narrative (Neuman, 1999). Such programs may also encourage parents to share in language and literacy experiences with their children. For instance, of parents who participated in Dolly Parton's Imagination Library (for a minimum of four months), a program that provides children with a book each month until they turn five, 85% reported reading to their child at least three times each week, and 59% reported reading every day (Ridzi, Sylvia, & Singh, 2014).

In addition to parental investment, income may also be related to children's outcomes through a family stress pathway, a model suggesting that lower income is associated with lower parental well-being, leading to poor parent–child interactions (Yeung et al., 2002). For instance, maternal depression, which is more common among low-income women (Chung, McCollum, Elo, Lee, & Culhane, 2004; Kiernan & Huerta, 2008; Mazza et al., 2017) often leads to less responsive and more withdrawn parenting, engaging in fewer back-and-forth conversations and using fewer words overall (Carter, Garrity-Rokous, Chazan-Cohen, Little, & Briggs-Gowan, 2001; Field, 2010; Herrera, Reissland, & Shepherd, 2004; Stein et al., 2008). These mothers also tend to talk less with their children and to use less complex language when they do. They also do not read as frequently with their children, which predicts lower vocabulary scores later (Paulson, Keefe, & Leiferman, 2009). Thus, interventions that address factors in both pathways may be particularly successful, especially if they are made easily accessible to low-income mothers, such as by being provided at convenient locations or across multiple platforms. In fact, several programs that combine access to literacy materials and social support for parents have been associated with benefits in maternal talk and book sharing, as well children's language and literacy development, including Reach Out and Read.

1.1. Reach Out and Read

Reach Out and Read (ROR) is a national program that aims to "make literacy promotion a standard part of pediatric primary care" (Willis, Kabler-Babitt, & Zuckerman, 2007, p. 632). ROR has three components: 1) at each well-child pediatric visit from six months to five years of age, families are provided with a free children's book, 2) pediatricians and other medical staff members provide guidance and support to parents to promote reading and other early literacy activities at each of these well-child visits, and 3) volunteers read aloud to children in the waiting room, modeling booksharing behavior for parents and providing literacy experiences for children.

Since its inception in 1989, impacts of ROR have been studied in various formats and with diverse populations. This research has indicated that ROR has a positive effect on the home literacy environment, with increases in booksharing and other language- and literacy-rich activities, as well as more positive attitudes about reading among parents (Needlman, Toker, Dreyer, Klass, & Mendelsohn, 2005; Weitzman, Roy, Walls, & Tomlin, 2004). This was true even with a single ROR interaction (Sanders, Gershon, Huffman, & Mendoza, 2000). These impacts, in turn, are related to increases in receptive and expressive vocabulary scores, especially in older toddlers (High, LaGasse, Becker, Ahlgren, & Gardner, 2000; Mendelsohn et al., 2001; Sharif, Reiber, & Ozuah, 2002). Further, qualitative data has indicated that parents feel supported through ROR, with receipt of bilingual books being particularly important for non-English speaking parents, and that the program benefits their entire family (Byington et al., 2008).

1.2. City's First Readers

Building on the potential for complementary programs to both provide parental support and increase utilization and impact of services across platforms for low-income families, an initiative was begun in 2014 called City's First Readers (CFR), with the intent of building links between literacy resources for low-income families in a variety of contexts across a large northeastern city. This initiative, led by Literacy Inc. (LINC), an organization that provides literacy support and parent education programs in communities and schools, aims to reinforce messaging across platforms and provide cross-referrals of services, with the ultimate goal of increased saturation of literacy resources in low-income communities, providing parents, teachers, and other childcare providers with the resources they need to promote school readiness in children ages 0–5. To date, the program has allowed CFR partners to expand services, provide additional opportunities for parent engagement and provision of books and toys, and, most importantly, to begin to build a network of literacy resources and messaging for low-income families. CFR partners include the public libraries, school-based programs (JumpStart), home visiting programs (Parent–Child Home Program), pediatric clinic programs (ROR, the Video Interaction Project), and community-based programs (LINC, Committee for Hispanic Children and Families, United Way, JCCA).

1.3. The current study

Despite the potential of linkages between different literacy programs, like those initiated by CFR, there has been limited study of these connections. One link that has the potential for near universal access to low-income families is that between primary care and public libraries. Parents who have a library card, visit the library with their infants and preschoolers, and know about library programs for children are more likely to read with their children at home and their children are more likely to be interested in books and reading (Baker, Scher, & Mackler, 1997; Chen, Rea, Shaw, & Bottino, 2016). In addition, library programs that encourage parents to share books with their children are related to increases in the number of books checked out, and to parents' support of other parents through sharing of favorite titles and tips for booksharing (Burger & Landerholm, 1991). However, Wasik and Hindman (2010) found that only about 27% of low-income families reported visiting the library once a month or more. On the other hand, approximately 95% of children in the United States receive scheduled vaccinations before school entry (Seither et al., 2014). Thus, linking libraries and pediatric care may provide both increased access to literacy materials and activities—increasing

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parental investment—and support for parents in engaging in literacy activities—subverting some impacts of family stress.

Thus, the current study sought to extend previous findings on the impacts of ROR, replicating results on the effects of ROR on the home literacy environment, and examining whether ROR itself was related to increased library use within the context of the City's First Readers initiative. Although ROR addresses American Academy of Pediatrics guidelines (Ref: AAP Policy Statement on Literacy Promotion), differences in availability of resources are associated with variation in delivery of program components over time, both between and within individual sites (King, Muzaffar, & George, 2009). In the case of the present analyses, challenges related to both funding and program supervision beginning prior to study recruitment led to less consistent availability of books for distribution and increased variability in delivery of the program to families. This variation has provided us with an opportunity to assess for potential impacts of ROR within the study described here.

We hypothesized that those families who received ROR would be more likely to use the library, based on additional knowledge about the importance of early literacy. More importantly, the study assessed the potential for additive and synergistic effects of literacy programs across platforms by examining whether receiving complementary information and resources across platforms would be associated with parents' reading behavior at home. We predicted that there would be differences in booksharing behaviors between parents who received ROR or used the library and those who did not, but that differences would be most dramatic between those parents who had access to both resources and those who did not have access to either. In addition, this study examined whether these impacts were different across infant and toddler age groups. Some ROR impacts have been strongest for older toddlers (e.g., High et al., 2000), while other studies have indicated that regular booksharing in infancy is particularly impactful, even though mothers report reading with their children more frequently as they get older (DeBaryshe, 1995; Raikes et al., 2006). Given this mixed evidence, we predicted that mothers would report reading and visiting the library more with their older toddlers, but that the influence of ROR and library resources may be particularly impactful for mothers of infants. This study was conducted in the context of a CFR implementation, which provided the opportunity to study direct linkages across ROR and the public library, two partner programs in the initiative. Thus, the present findings are important both in evaluating the additive benefits of primary care programs and libraries, and as a first assessment of the larger CFR initiative.

2. Method

2.1. Participants and setting

Children and their primary caregiver were screened in the waiting room of two urban pediatric clinics, one in a large public hospital, and one at a smaller federally qualified community health center (FQHC). The public hospital clinic is a university-affiliated teaching institution, and attracts families from across the city, while the FQHC sees patients primarily from the immediate neighborhood. Despite this, the clinics have substantial overlap. Both were sites of the CFR initiative in which families received ROR and employees were able to provide library cards for interested families. Both clinics also serve primarily low-income, immigrant, Latinx families, are part of larger systems that provide both primary and specialty care for children and adults, and provide services regardless of a patient's insurance status or ability to pay.

Families who met screening criteria—those who had a child under three years of age who was a primary care patient at the clinic, and who spoke either English or Spanish—were recruited into the study. The analytic sample included 98 children (51% male) and their primary caregiver. Demographic characteristics for the sample can be found in Table 1. Overall, approximately half of the caregivers had a high school education or higher (48%), and most were immigrants to the US and spoke Spanish as their primary language. Children's ages in months were calculated from birthdates, and age subgroups were created based on a median split, corresponding to Infancy (0–12 months) and Toddlerhood (12–42 months) age ranges. The mean age of the children in the sample was 13.05 months ($SD = 9.73$), with 49 children in each of the Infancy and Toddlerhood subgroups. Further, all children had received at least two well-child visits at the time of the survey.

Table 1
Sample demographics.

	n (%) ($N = 98$)
Mother Latino	79 (80%)
Spanish-speaking	76 (77%)
U.S. immigrant	73 (74%)
Mother employed	26 (27%)
Mother graduated high school	44 (45%)
Mother married or with partner	76 (78%)
Male child	50 (51%)
Child age	
0–12 months	49 (50%)
12–42 months	49 (50%)
Referred to early intervention	9 (9%)

2.2. Procedure and measures

Within a larger study of impacts of City's First Readers linkages, baseline interviews were conducted with parents recruited from pediatric clinics over a seven month period, from March to October 2016. For this initial, cross-sectional, correlational analysis, a convenience sample of parents were screened for inclusion criteria, and eligible parents ($n = 184$) were given additional information about the study. The analytic sample comprises 98 parents who signed informed consent, and who participated in the baseline interview. Interviews, which were conducted in the parent's native language, elicited information on demographics, child care, child health and insurance status, and receipt of social services (e.g., WIC, Medicaid, Unemployment), in addition to knowledge and experience of literacy programs in the clinic (i.e., ROR), knowledge and use of literacy resources in the community (i.e., the public library), and the home environment, including their literacy activities at home (these three elements are discussed in more detail below). To minimize parental bias in remembering ROR experiences or guidance, interviews were conducted either in-person in the waiting room before the child's pediatric visit, or by phone before their next pediatric appointment ($n = 60$; $M(SD) = 4.6(3.2)$ weeks). Interviewers included three bilingual research assistants, trained in delivering the standardized instruments, in culturally-sensitive interviewing, and in working with low-income and low-literacy populations.

2.2.1. Clinic-based literacy programs

During the interview, caregivers were asked three yes/no questions adapted from Mendelsohn et al. (2001) regarding Reach Out and Read. As mentioned above, ROR includes three potential components (provision of a book, guidance and support from a health care provider, waiting room volunteer). Parents were asked whether they had ever experienced each of these possible parts of ROR at their pediatric clinic. However, because the volunteer component was not frequently utilized at the sites and very few caregivers reported a volunteer ever reading in the waiting room ($n = 5$), only the first two questions were used in the present analyses. Thus, parents received a score between zero and two; because no parents reported receiving guidance from their health care

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provider without also receiving a book, these scores corresponded to No ROR (0), Book Only (1), or Book + Guidance (2).

2.2.2. Library access and use

Interviewers also asked caregivers yes/no questions about whether they had visited their local library in the last year, whether they visited the library with their child, whether they checked out books for their child, and whether they participated in children's programs at the library, in addition to questions about adult use of the library, including for internet access, classes/workshops, and to check out adult books. These questions were adapted from the Pew Research Center Libraries 2016 survey (Horrigan, 2016), and were similar to those used in previous studies (e.g., Chen et al., 2016). For the current research, the four questions involving use of the library with and for their child were used. Because we were most interested in whether parents used the library for any type of literacy activities with their child, which would be predicated on visiting the library, scores were collapsed into three categories: no library use (0), visited library (1), visited + used one or more children's resource (2).

Access to clinic and community literacy resources were also combined into a single composite score in order to examine potential additive effects of these programs. None of the families who received no ROR used children's library resources, and very few families (n = 3) who received a book only used children's library resources. Therefore, families received composite scores between 0 and 2, corresponding to those who received no ROR and did not utilize library resources (no resources; 0), those who received any ROR but utilized few or no library resources (ROR only; 1) and those who received any ROR and utilized several library resources (ROR & library; 2).

2.2.3. Home literacy activities

Literacy activities in the home were assessed as part of the parent interview using the READ subscale of the StimQ Cognitive Home Environment assessment (Mendelsohn, Cates et al., 2011). The StimQ is a standardized interview measure of caregiver cognitive stimulation and includes scales assessing Parent Verbal Responsivity (PVR), Parental Involvement in Developmental Advance (i.e. teaching activities; PIDA)), Availability of Learning Materials (ALM) and Reading Activities (READ). The READ scale includes questions regarding the frequency of caregiver-child booksharing, booksharing routines, types of books read, and the quality of booksharing interactions, including whether the caregiver asks questions, points to and labels pictures, or talks about feelings/emotions of characters. This allows the READ scale to be broken down into further subscales of Reading Quantity (i.e., frequency), Reading Diversity (i.e., book types), and Reading Quality (i.e., interactions). The StimQ was developed for use in English and Spanish. Most questions ask for either descriptions/examples (e.g., name some of your child's favorite books) or include follow-up questions (e.g., would you say you do this sometimes, most of the time, or always) in order to ensure accuracy and limit social desirability bias, and interviewers were trained in eliciting this additional information. The StimQ has been shown to have high concurrent validity with the HOME Inventory and high internal consistency, with Cronbach's alpha ranging from 0.88 to 0.93 (Dreyer, Mendelsohn, & Tamis-LeMonda, 1996; Mendelsohn, Cates et al., 2011). Three versions of the StimQ have been developed and validated: StimQ Infant, StimQ Toddler, and StimQ Preschool. (More information can be found at https://med.nyu.edu/pediatrics/developmental/research/belle-project/stimq-cognitive-home-environment.) Because the age range for the larger study of CFR spanned the Infant and Toddler age groups, a modified version of the StimQ was used in the current analysis. The Reading Quantity and Reading Quality subscales of the StimQ Infant and StimQ Toddler are identical; however, the Reading Diversity subscale is somewhat different. Therefore, the modified StimQ used here asked parents about all types of books included in both validated scales, resulting in a possible range for Reading Diversity of 0–10, rather than the 0–6 possible in each of the StimQ Infant and StimQ Toddler measures.

2.3. Analysis

Descriptive analyses of parents' experience with ROR and the library, as well as their booksharing behaviors were conducted both for the sample overall and comparing scores across gender using T-tests, as previous research has indicated that reading aloud is more common with female children in low-income families (Raikes et al., 2006). Next, composite scores were created for caregivers' experiences with ROR and knowledge about/use of the public library, as described above. T-tests were also used to examine ROR, library use, and StimQ READ and READ subscale scores across age groups. In order to account for the potential differential impacts of age on the outcomes of interest, main analyses were conducted in two ways: First, one-way analysis of covariance (ANCOVA) was used to evaluate the relations between ROR, library use, and the two combined on home literacy activities, while controlling for the child's age as a continuous variable. Then, One-way ANOVAs were used to measure these associations separately in infants and toddlers. Pairwise comparisons using Fisher's LSD were used to examine differences between groups in all cases, as there were exactly three groups in the ROR, library use, and combined composites.

3. Results

Table 2 presents descriptive statistics for parents' experience with ROR and the library, as well as scores on the READ scale and the Reading Quantity, Diversity, and Quality subscales of the StimQ, both overall and across genders. In this sample, there were no significant differences between boys and girls on any measure.

3.1. Impact of age on ROR, library use, and home literacy activities

There were significant differences in experience with ROR between infants and toddlers, and in the combination of literacy resources, but not in library utilization alone. Parents of toddlers reported having received more components of ROR, $t(90) = -3.42$, $p < 0.01$, and they had significantly higher composite scores for the combination of ROR and library use, $t(90) = -4.34$, $p < .01$. Toddlers also had significantly higher scores on the StimQ READ scale, as well as the Reading Quantity, Reading Diversity, and Reading Quality subscales, $t(90) = -2.87$, $p < .01$, $t(90) = -2.14$, $p < .05$, $t(88) = -2.44$, $p < .05$, and $t(90) = -3.97$, $p < .01$, respectively (Fig. 1).

3.2. Association of ROR and library exposure with parent–child booksharing

One-way ANCOVAs examined differences in parent–child booksharing in the home between parents who received no ROR, who received only a book, and who received both a book and guidance from their pediatrician, as well as between parents who did not go to the library, those who went to the library but did not use any other child literacy resources there, and those who used one or more literacy resources. First, these analyses indicated a main effect of ROR experience on READ scores overall, $F(2, 89) = 8.00$, $p < .01$, $\eta_p^2 = .15$, as well as in the Reading Quantity subscale, $F(2, 89) = 6.35$, $p < .01$, $\eta_p^2 = .13$, Reading Diversity subscale, $F(2, 87) = 5.34$, $p < .01$, $\eta_p^2 = .11$, and the Reading Quality subscale, $F(2, 89) = 5.78$, $p. < .01$, $\eta_p^2 = .12$. Pairwise comparisons indicated that for the READ scale overall and all subscales, parents who received both a book and counseling from a pediatric health care provider scored

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Table 2
Descriptive statistics for ROR, library, and booksharing measures: overall and by gender.

	N (%)		
	Full sample	Males	Females
ROR			
No ROR	24 (24%)	10 (20%)	14 (27%)
Book only	30 (31%)	15 (30%)	15 (31%)
Book + guidance	44 (45%)	24 (50%)	20 (42%)
Library use			
No library	8 (8%)	5 (10%)	3 (6%)
Visited library	80 (82%)	40 (80%)	40 (83%)
Visited + used children's resources	10 (10%)	5 (10%)	5 (11%)
	M(*SD*)		
READ score (score: 0–23)	9.46 (7.09)	9.04 (7.32)	9.68 (7.02)
Reading quantity (score: 0–9)	2.80 (2.36)	2.80 (2.46)	2.84 (2.28)
Reading diversity (score: 0–10)	4.69 (3.73)	4.59 (3.79)	4.68 (3.79)
Reading quality (score: 0–4)	2.07 (1.62)	1.84 (1.66)	2.16 (1.55)

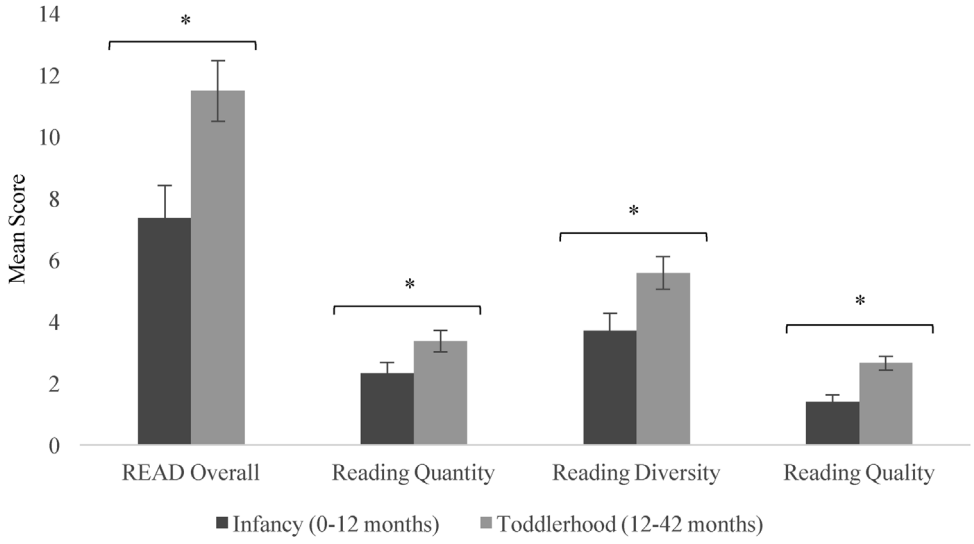

Fig. 1. Mean StimQ READ and subscale scores across infant and toddler age groups.

significantly higher than those who only received a book, (READ: $M_{diff} = 3.64$, $p < .05$, Reading Quantity: $M_{diff} = 1.29$, $p < .05$, Reading Diversity: $M_{diff} = 1.64$, $p < .05$, Reading Quality: $M_{diff} = 0.70$, $p < .05$), as well as those who did not receive any ROR (READ: $M_{diff} = 6.71$, $p < .01$, Reading Quantity: $M_{diff} = 2.02$, $p < .01$, Reading Diversity: $M_{diff} = 3.09$, $p < .01$, Reading Quality: $M_{diff} = 1.23$, $p < .01$). There were no significant differences between those who only received a book and those who did not receive ROR on any of the scales. Thus, receiving both components of ROR seems to be critical in parents' booksharing behavior (Fig. 2a).

Similarly, as seen in Fig. 2b, there was a significant main effect of library use on parents' scores on the READ scale overall, $F(2, 89) = 4.36$, $p < .05$, $\eta_p^2 = .09$, and on the Reading Diversity subscale, $F(2, 87) = 4.64$, $p < .05$, $\eta_p^2 = .10$. Effects of library use on the Reading Quantity, $F(2, 89) = 2.36$, $p = .10$, $\eta_p^2 = .05$ and Reading Quality, $F(2, 89) = 2.75$, $p = .07$, $\eta_p^2 = .06$, subscales were marginally significant. Pairwise comparisons found that in all scales, significant differences in scores were found between families who visited the library and did not use children's resources and those who reported using one or more resources, READ: $M_{diff} = 6.56$, $p < .01$; Reading Diversity: $M_{diff} = 3.69$, $p < .01$; Reading Quantity: $M_{diff} = 1.63$, $p < .05$; Reading Quality: $M_{diff} = 1.03$, $p < .01$.

The combination of ROR and library exposure was also examined to determine whether there were additive impacts on parents' booksharing behaviors for those families who both received ROR and utilized the library. One-way ANCOVA indicated significant differences between groups in overall READ scores, $F(2, 89) = 8.13$, $p < .01$, $\eta_p^2 = .16$, as well as in the Reading Quantity, $F(2, 89) = 4.62$, $p < .05$, $\eta_p^2 = .09$, Reading Diversity, $F(2, 87) = 7.44$, $p < .01$, $\eta_p^2 = .15$, and Reading Quality, $F(2, 89) = 4.75$, $p < .05$, $\eta_p^2 = .10$, subscales. Pairwise comparisons indicated that parents in the ROR only group and the ROR & library group scored significantly higher than parents in the no resources group on the READ scale, $M_{diff} = 4.75$, $p < .01$, $M_{diff} = 10.17$, $p < .01$, respectively, as well as on all three subscales: Reading Quantity: $M_{diff} = 1.38$, $p < .05$, $M_{diff} = 2.66$, $p < .01$; Reading Diversity: $M_{diff} = 2.18$, $p < .05$, $M_{diff} = 5.46$, $p < .01$; Reading Quality: $M_{diff} = 0.88$, $p < .05$, $M_{diff} = 1.66$, $p < .01$. Further, parents in the ROR & library group scored significantly higher than parents in the ROR only group on the READ scale overall, $M_{diff} = 5.42$, $p < .05$, as well as the Reading Diversity subscale, $M_{diff} = 3.28$, $p < .01$. Average scores on the READ scale and subscales for each group are presented in Fig. 3.

3.2.1. ROR, library use, and booksharing in infants and toddlers

In order to determine whether age impacted the associations found above, One-way ANOVAs were conducted to examine relations between ROR and library use, ROR and booksharing, library use and booksharing, and the combined ROR and library use com-

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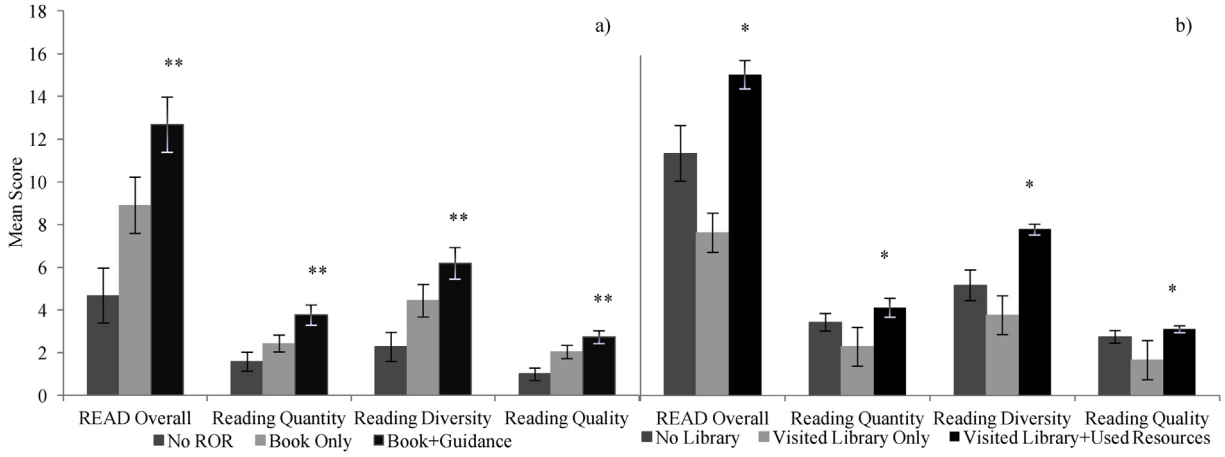

Fig. 2. Mean StimQ READ and subscale scores across ROR (a) and library use (b) groups.

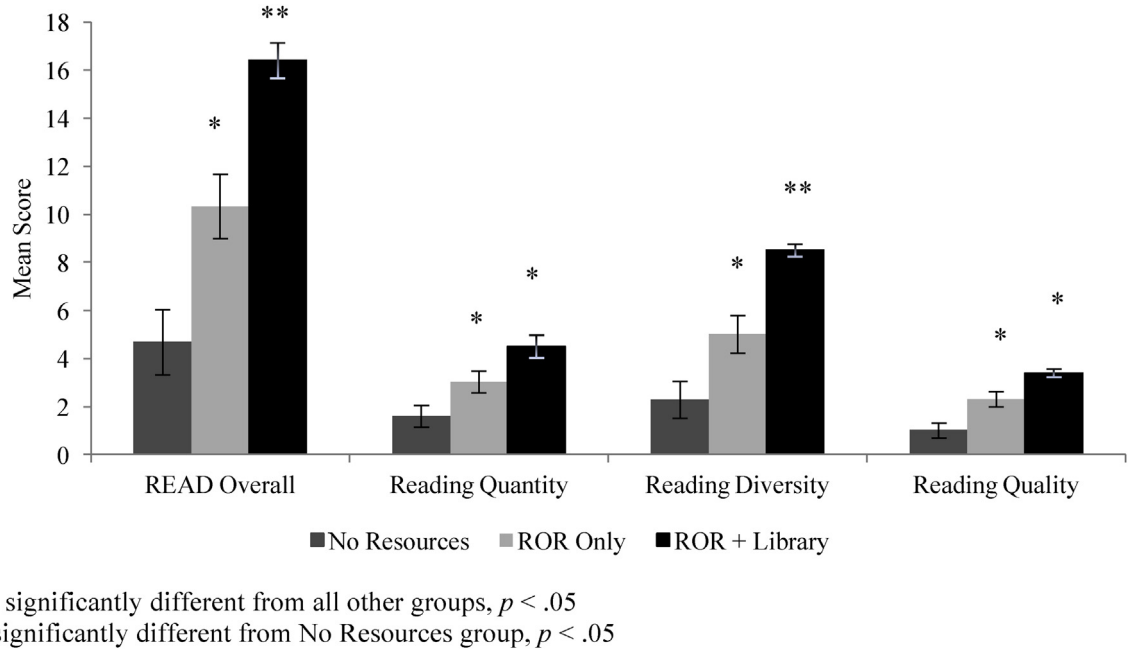

Fig. 3. Mean StimQ READ and subscale scores across combined literacy resource groups.

posite and booksharing. The same pattern of results was seen (see Table 3). Although there were no significant main effect of ROR on library use, ROR had significant impacts on the StimQ READ scale and the Reading Diversity and Reading Quality subscales in infancy, and on the READ scale and Reading Quantity subscale in toddlerhood. Library use was not significantly associated with home booksharing in infancy. In toddlerhood, though, there was a significant main effect of library use on overall READ scores, and all three subscales. Finally, parents' combined literacy resource scores had a main effect on overall READ scores and all three subscales, but significant main effects were seen only for the overall READ scale and Reading Diversity subscale in toddlerhood.

4. Discussion

The present study found enhancements in home literacy behaviors that were associated with receiving literacy resources from multiple sources and platforms. When pediatricians spoke with the parents of their patients about the importance of reading and provided a book, those parents were more likely to read with their children at home, to read a wider variety of books, and to have higher quality reading interactions, involving asking their child questions, pointing to and labeling pictures, and expanding on the written story. Parents who visited the library and used literacy resources also scored higher on measures in these areas. Moreover, this pattern was again seen, and with greater effects, for parents who *both* heard such advice from their pediatrician and used the library. These parents read more frequently at home and had higher quality booksharing interactions than those who did not receive or utilize resources, and they read a wider variety of books than even those parents who received ROR but did not use the library. These findings are important for two reasons. They provide evidence for the impact of support from a trusted source on parents' literacy activities, and they also indicate the potential for additive benefits of literacy messaging across platforms and contexts.

Please cite this article in press as: Canfield, C. F., et al. Encouraging parent–child book sharing: Potential additive benefits of literacy promotion in health care and the community. *Early Childhood Research Quarterly* (2018), https://doi.org/10.1016/j.ecresq.2018.11.002

Table 3
Associations between ROR, library use, and home booksharing, by age.

	Infant			Toddler		
	F	*p*	η^2p	*F*	*p*	η^2p
Main effect: library use						
ROR	1.65	.20	.07	.43	.65	.02
Main effect: StimQ READ						
ROR	4.28*	<.05	.17	4.62*	<.05	.18
Library use	0.77	.47	.04	5.54**	<.01	.21
ROR + library use	4.78*	<.05	.18	4.00*	<.05	.16
Main effect: reading quantity						
ROR	2.22	.12	.09	6.56**	<.01	.23
Library use	1.54	.23	.07	3.56*	<.05	.14
ROR + library use	3.33*	<.05	.13	1.79	.18	.08
Main effect: reading diversity						
ROR	4.07*	<.05	.16	2.25	.12	.10
Library use	.72	.49	.03	5.56**	<.01	.21
ROR + library use	4.45*	<.05	.18	4,71*	<.05	.18
Main effect: reading quality						
ROR	4.30*	<.05	.17	2.11	.13	.09
Library use	0.69	.51	.03	3.64**	<.01	.15
ROR + library use	4.19*	<.05	.16	2.19	.12	.09

* $p < .05$.
** $p < .01$.

Parents who received both a book and guidance about the importance of reading through ROR were most likely to engage in literacy activities with their children through booksharing at home. This relation was not observed in families who only received a book, indicating that while providing literacy materials is important for increased parent–child booksharing, it may not be sufficient. Instead, hearing from a trusted authority, such as a pediatrician, that reading with their child early and often is beneficial for brain development, behavior, and academic achievement, was linked to actual differences in behavior. This may be due to the fact that parents felt supported in attaining their goals for their children and in engaging in literacy activities in their native language and regardless of their own literacy level. In addition to more frequent reading at home with a greater diversity of books, these differences may include increased use of the library for borrowing children's books and attending children's programs, providing additional access and sources of support for parents. This relation was significant for families with children in the ROR age range in our sample, indicating the potential for cross-platform impacts. All of these activities have been linked to increased early literacy and later reading ability, giving these children an advantage over their peers.

Parents' booksharing interactions at home were highest when they received ROR in their pediatric clinic and utilized early literacy resources at their library. When parents were provided with resources and guidance about the importance of reading across both of these contexts, they reported reading more often at home, reading a wide variety of books, and engaging in additional literacy-promoting behaviors while sharing books with their child, such as pointing to pictures and asking questions. Thus, programs aimed at connecting resources across platforms and aligning messaging focused on early childhood literacy may provide additive benefits for children and families. Citywide initiatives, such as Countdown to Kindergarten, a model created in Boston that has been adapted in cities across the United States, including South Carolina and Maryland have helped ensure children are ready for school through parent education, family-school communication before school entry, and community involvement. More recent efforts, such as City's First Readers, A Running Start Philadelphia, and Denver's Birth to Eight Roadmap, have the potential to follow suit by linking organizations across schools, healthcare, the community, and the home beginning at birth.

Such wide-ranging efforts may be especially helpful in engaging parents when they provide both literacy resources and support in the places parents already go. Previous results from studies of ROR and VIP have indicated that enhancing parent-child interactions in itself improves parental well-being, with increased play and bookreading experiences linked to lower maternal depression and stress (e.g., Cates et al., 2016). Taken together, these findings indicate that supporting parents in efforts to share books and other literacy activities with their children in the home may be important for both closing the word gap and improving family stress, which in turn may lead to even greater opportunities for such cognitive stimulation from parents and better outcomes for children.

An additional consideration in evaluating these findings is the importance of age in the relation between ROR, library use, and booksharing at home. Age was a significant covariate in several ANCOVA models, indicating that the age of the child influenced parents' behavior and the resources they knew of and used. Findings of the subgroup analysis also supported the hypothesis that parents would report more experience with ROR and the library, as well as more booksharing behaviors, as children got older. Parents of toddlers were more likely to use the library and were more likely to report having received books and guidance from their health care provider. To some extent, this finding may be due to the fact that parents of toddlers had more opportunities than parents of infants to receive ROR, given the additional well-child visits they would have had over time. This may especially be the case because ROR is not offered until infants are six months old. However, 50% (n = 14) of parents with infants under six months of age reported having some experience with ROR, which could potentially have been with an older sibling. In fact, of the 19 parents with infants under six months who reported having other children in the home, only 5 reported never having received any ROR. Parents' extension of this experience to their infants lends support for the broad impacts of literacy support in the pediatric clinic. Further, the inconsistent delivery of ROR prior to study recruitment and the fact that all parents had received at least two well-child visits, means that differences between Infants and Toddlers were not entirely due to increased opportunity.

It was also predicted that literacy resources would be particularly impactful for parents of infants. In the present sample, this was true for associations of home booksharing with ROR and ROR

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and library use combined, though the opposite was true for the association between home booksharing and library use alone. This was likely the case because library use was much lower among parents of infants than it was among parents of toddlers. Taken together, these findings signify the importance of increasing access to and knowledge about literacy resources even early in infancy, and suggest that beginning ROR, and linking it to library access, at birth may have additional benefits. Future research should further examine this question.

The present study does have some limitations. Because this is a cross-sectional analysis, we cannot make causal inferences. For instance, parents who read more may be more likely to remember their pediatrician speaking with them about reading, rather than the pediatrician's advice making reading more likely. The exclusive use of parent report may also be problematic because of other biases, including social desirability. However, the StimQ—the main outcome measure—was developed to specifically address these issues, and Research Assistants were trained to elicit information without judgment or stigma, mitigating some of these potential issues.

In addition, the present study only looked at linkages between two platforms—ROR and the library—and might have missed other impacts related to CFR more broadly. Nevertheless, the strengthening links between ROR, library use, and reading behaviors in the home were clear, and provide an initial evaluation of the potential for linkages between ROR and library programs, as well as among programs in a number of different contexts, to provide additive early literacy benefits. Additional follow-up evaluation is currently underway to evaluate the effects of ROR, library programs, and more explicit links between them on parents behavior in the short- and medium-term, as well as whether reinforcing and supportive messaging and resources across additional CFR programs will create greater impacts. Future studies should also examine the quality of this messaging, both by assessing the guidance provided by health care staff in ROR, as well as evaluating access to services and programs (e.g., librarian helpfulness, signage) and program messaging within the library.

The sample in the present study was largely Latinx, and thus, these findings may not generalize to other populations. For instance, families in the current study may face additional real or perceived barriers to using the library, including language and immigrant status. However, as noted above, previous research has indicated that this population is particularly at risk for low literacy and school readiness skills, making them of particular interest for the current study. Future research with more diverse low-income samples can provide additional information on the impact of early literacy programming across platforms, providing a more complete analysis of programs aimed to address income-related gaps in early literacy and school readiness.

5. Conclusions

The present study has two critical policy implications. First, this study provides compelling evidence for programs seeking to reduce word-gap related disparities to simultaneously provide children's books as props to support language-interactions while providing guidance and support through a trusted provider for sharing these books with the child in the home. In particular, study findings highlight the importance of programs like Reach Out and Read and Video Interaction Project which integrate these strategies utilizing a universal, low-cost pediatric primary care platform. Second, the present study provides strong support for programs seeking to develop links between healthcare and community programs such as libraries to increase early literacy activities among low-income parents, and in turn bridge the word gap. Because reading interactions in the home are critical for both language and literacy skills at school entry as well as continued success in reading and academic achievement, increasing parent engagement in such activities is crucial, particularly for low-income children who often fall behind their more affluent peers early in preschool or kindergarten. This study indicates that providing consistent guidance and support on reading and literacy in both the pediatric clinic and the library is linked to higher levels of booksharing in the home. Thus, programs like City's First Readers, which explicitly seek to link such platforms and resources, may provide additive impacts on children's early literacy outcomes.

Acknowledgements

The authors would like to acknowledge the support for and contributions to this research from Ingrid Bentil of Literacy Inc. We would also like to thank Franco Barsanti, Viju Jacob, Luis Rodriguez, and all of the clinicians and staff at Bella Vista Health Center of Urban Health Plan and Woodhull Medical Center, as well as all of the families who participated in this study. This research was supported in part by funding from the New York City Council, through the City's First Readers Initiative. This project also participated in the US Department of Health and Human Services (US DHHS) Health Resources and Services Administration (HRSA) Bridging the Word Gap Research Network Research Collaborative.

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