



Early Literacy Learning Experiences across Home and Community Libraries for Young Children Who Have Autism

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Abstract

Objectives Many school-aged children diagnosed with autism spectrum disorder display challenges in literacy development. Early learning experiences in the home and the community are important for the development of literacy success. Community libraries deliver story time to support children's literacy experience and to provide parents with literacy teaching strategies. Little research has been conducted on the uptake of literacy experiences of families with children who have autism. This study investigated the early literacy experiences in the home and community of children (2–5 years) who have autism compared with their typically developing peers.

Methods Participants included parents of children who have autism ($n = 41$) and parents of typically developing children ($n = 164$). Parents completed an online questionnaire on early literacy, library visits, and early literacy session attendance.

Results A rich home literacy environment was reported in both groups. Differences were reported between groups on interest in books and frequency of shared book reading. This appeared to be driven by the presence of the child's language ability (level of phrase speech). When controlled for presence of phrase speech, the group differences were no longer evident. Significant group differences were reported on reasons for not attending early literacy library sessions. Parents of children who have autism more frequently identified unsuitability of the environment and child not interested as reasons for nonattendance than parents of typically developing children.

Conclusion Identifying barriers to early literacy experiences for children who have autism is important to inform future development of supportive experiences for literacy development in this group.

Keywords Reading · Story-time · Preschool · Environmental barriers · Emergent literacy

The educational and academic challenges of children diagnosed with autism spectrum disorder have been increasingly acknowledged (Australian Bureau of Statistics 2014; for a review, see Keen et al. 2015). Literacy learning in particular

has been highlighted as an area of need and interest (e.g. Dynia et al. 2014; McIntyre et al. 2017; Westerveld et al. 2017b; Whalon 2018), with up to 65% of school-aged children who have autism displaying challenges in literacy development, including decoding and comprehension (Arciuli et al. 2013; Jones et al. 2009; Nation et al. 2006; Ricketts 2011; Westerveld et al. 2018). Literacy challenges in this population are perhaps not surprising given the strong associations between spoken language and literacy (Catts and Kamhi 2014) and the frequency of language impairments in this population (for a meta-analysis of receptive and expressive language, see Kwok et al. 2015). Other factors that may potentially hamper these children's literacy development and/or their engagement in literacy learning activities include cognitive characteristics (e.g. theory of mind skills, see Dore et al. 2018 for a discussion), commonly co-morbid intellectual impairments (e.g. approximately 30%, Baio et al. 2018) and autism traits such as restricted interests and repetitive behaviours. Furthermore,

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children who have autism are frequently reported to demonstrate hypersensitivity to some sensory input (Simpson et al. 2019) and parents report that the sensory features in the environment can be a barrier to their child's activity participation (Pfeiffer et al. 2017). Literacy development begins long before children start school (Whitehurst and Lonigan 1998), offering experiences for early identification of delays or challenges and early intervention. During this period, referred to as the emergent literacy stage, children acquire the precursor literacy skills that link to later literacy success (Sénéchal 2006; Whitehurst and Lonigan 1998). Consistent with a social constructivist viewpoint (Vygotsky 1978), these skills are acquired through social interactions with parents/caregivers in a range of early learning experiences, such as shared book reading at home or through library visits (Boudreau 2005; Sénéchal 2006). To date however, there is limited research on the uptake of these important potential literacy learning experiences by parents of children who have autism and the factors that may facilitate or form barriers to engagement.

Emergent literacy skills may be conceptualised as the precursor literacy skills that are needed to learn to read accurately and fluently, with comprehension (National Early Literacy Panel 2008). The five most predictive preschool skills of later literacy proficiency include alphabet knowledge (phonics), phonological awareness, vocabulary, fluency, and language comprehension (National Early Literacy Panel 2008). Recent research has started to investigate the emergent literacy profiles of preschoolers who have autism in order to understand the relatively high incidence of reading difficulties in this population (Lanter et al. 2012; Westerveld et al. 2017b; Westerveld et al. 2016). At a group level, preschoolers (ages 2–5 years) who have autism often demonstrate strengths in emergent literacy skills that are linked to later decoding of words (i.e. letter knowledge), but challenges in oral language-related skills such as story comprehension and retelling (Davidson and Ellis Weismer 2014; Westerveld and Roberts 2017). Currently, it is unclear if these 'uneven' emergent literacy profiles can be explained by these children's often comorbid oral language and/or cognitive difficulties, their autism traits, or a combination of these (Davidson and Ellis Weismer 2014; Westerveld et al. 2017b). It is also not clear how the home literacy environment plays a role in the emergent literacy development of children who have autism.

Elements of the home literacy environment including the number of books in the home and the frequency of shared book reading have been identified as predictors of vocabulary learning and future reading success (Farrant and Zubrick 2013; Sénéchal 2006). In addition, parents' use of explicit teaching behaviours, as well as factors influencing social interactions around print, including parent and child interest in print, have been identified as environmental factors for consideration (Frijters et al. 2000; Sonnenschein and Munsterman 2002). This research has focused on typically developing

children and is well established (Hood et al. 2008; Sénéchal 2006; Sénéchal and LeFevre 2002; Sénéchal et al. 2008). The emerging research investigating the home literacy environment of children who have autism would suggest differences in these environments of children who have autism (Lucas and Norbury 2018; Westerveld and van Bysterveldt 2017). To illustrate, Westerveld and van Bysterveldt (2017) found that although parents of children who have autism reported exposing their children to books from an early age and owning a range of children's books, compared with parents with preschool children with Down syndrome, they reportedly read to their children less frequently, which reported a lower interest in books by their children who have autism.

Parents' explicit teaching of print-related skills during shared book reading is an important predictor of children's alphabet knowledge and reading fluency (Sénéchal 2006). However, without instruction to do so, parents rarely explicitly refer to print when sharing books with their typically developing preschoolers (Ezell and Justice 2000; Hindman et al. 2014), nor with their preschoolers who have autism (Westerveld et al. 2019). Yet, with minimal instruction, parents of typically developing children are able to incorporate these print referencing behaviours during shared book reading activities, resulting in an improvement in their children's print-related emergent literacy skills (Justice and Ezell 2000). Furthermore, recent research addressing shared book reading intervention for preschoolers who have autism has shown the effectiveness of these type of interventions for changing parent shared book reading behaviours, with parents receiving the intervention demonstrating an increased use of book-related language and an increase in time spent sharing books with their children (Westerveld et al. 2017a). Book reading interventions are often delivered by professionals (e.g. speech pathologists, educators), and may not be easily accessed by parents of young children. Identifying ways parents can access information regarding effective shared book reading practices within the community may provide them with a feasible alternative.

Public libraries play a key role in promoting emergent literacy experiences with families and their young children. In addition to providing a wide range of literary sources including age-appropriate books and multimedia resources, they provide activities to enhance literacy development and offer informal education services (International Federation of Library Services 2007). This has resulted in a rise in library initiatives to engage young children from birth to school age in literacy experiences (Barratt-Pugh and Rohl 2016; Rankin 2016). For example, in Australia, librarians develop partnerships with families and community agencies through initiatives such as book gifting, baby rhyme time, toddler time, and preschool storytime (Australian Library and Information Association 2012; Barratt-Pugh and Rohl 2016). Sessions conducted in the library create informal learning environments

whereby librarians' model shared book reading strategies for parents and caregivers, thus supporting the development of literacy skills and knowledge to encourage language and literacy learning in the home. While these initiatives have been received positively by parents and have resulted in parents' improved skills and confidence in promoting shared book reading with their child (Barratt-Pugh and Allen 2011; Barratt-Pugh and Rohl 2016; Demack and Stevens 2013), they have mainly focused on the general population accessing the library. More recently, there has been an emergence of library initiatives to create accessible learning experiences for diverse learners. These include targeted story times (e.g. sensory storytimes) and inclusive story times (Adkins and Bushman 2015; Kaeding et al. 2017). Although such practices lay the foundations for services that support families of children with disabilities (including autism), there is little research addressing their effectiveness.

Of the limited research examining access to library-based early childhood literacy programs, children with disabilities attend less than their typically developing peers (Lopez et al. 2017; Prendergast 2016). Lopez et al. (2017) surveyed 430 public library leaders in the USA to investigate their family engagement practices. On at least a weekly basis, 74% of the libraries reported offering early childhood literacy programs, while 10% provided sessions engaging children with special needs. In libraries, program support for children with disabilities tends to focus on visible disabilities and address areas such as physical access to the program and access to materials (Hill 2013; Prendergast 2016). The difficulties of children who have autism may experience in accessing the library and story time sessions may be less recognised as part of their condition, with parents feeling judged for their child's behaviour (Prendergast 2016). A further barrier to deliver accessible sessions is the librarians' limited knowledge of specific disabilities (Kaeding et al. 2017). Understanding the experiences of parents of children with disabilities accessing libraries is a valuable information to assist in strengthening library and family relationships.

Prendergast (2016) interviewed 13 parents of children (2–8 years) with disabilities including eight children who have autism. Although parents viewed early literacy sessions ("Storytimes") as valuable, they discontinued attending due to the difficulties their child experienced as a result of the physical environment. They were also unlikely to have discussed these issues with the librarians. Although this study identified environmental factors impacting on attendance for parents and their preschoolers with disabilities, there may be other factors that also influence parents accessing library early literacy sessions. These include busy schedules related to the child's early intervention-related activities (e.g. speech pathology, early intervention services, medical appointments) or parents' lack of awareness of the importance of story book reading for their child's later literacy success.

We aimed to understand the similarities and differences in emergent literacy experiences (home and libraries) in young children (aged 2–5 years) on the autism spectrum and their peers without developmental disorders. Frequency of library visits and attendance at early literacy sessions were of particular interest. Three facets of emergent literacy learning in the home were explored relative to library and early literacy session attendance, i.e. (a) child interest in books, (b) frequency of shared book reading at home, and (c) number of children's books in the home. Our research questions were as follows: What emergent literacy experiences do preschool children who have autism and their typically developing peers engage in across the home and community; Do children who have autism differ in home literacy experiences (child interest in books, frequency of parent-child shared book reading, number of children's books in the home) to their typically developing peers; Do parents of children who have autism differ in their frequency of attending community libraries or early literacy sessions in libraries compared to parents of typically developing children; Do they differ in reported barriers to attending early literacy sessions; How do home literacy experiences link to reported frequency of library visits and early literacy session attendance for children who have autism and their typically developing peers?

Method

Participants

The online questionnaire was completed by 426 parents/caregivers of preschool children with and without various diagnoses. As we aimed to explore differences and similarities between preschool children who have autism and their typically developing peers, those with other diagnoses and their parent/caregivers were excluded from analyses ($n = 28$). Children aged 26 months or under ($n = 57$) and those residing in countries other than Australia ($n = 134$) were also excluded. Subsequently, responses from 41 parents/caregivers of children with a reported autism spectrum disorder diagnosis (aged 27 to 70 months; $M = 49.44$ months; $SD = 13.07$) and 164 parents/caregivers of typically developing children (aged 26 to 70 months; $M = 47.01$ months; $SD = 11.35$) were retained for final analyses ($N = 205$). Groups did not differ on age, $t(203) = -1.19$, $p = .235$, $d = 0.20$. There was a statistically significant difference between groups for gender with a higher proportion of males in the autism group compared with the control group, $\chi^2(1) = 5.926$, $p = .015$, $\phi = 0.17$. This is consistent with the prevalence data that likewise finds approximately 3–4 males, 1 female (e.g. Baio et al. (2018)). However, groups also differed on parent education, $\chi^2(4) = 11.22$, $p = .024$, $\phi = 0.234$, with more parents of the typically developing group reporting having a bachelor or postgraduate

qualification. Participant demographic characteristics for each group are shown in Table 1.

Parent’s report of whether their child combined words together to form a sentence was used as a descriptor for child language ability. Group comparisons showed a significant difference between groups on the ability to combine words, $\chi^2(1) = 44.96, p < .001, \varphi = 0.468$, with more parents of children who have autism ($n = 13, 31.7\%$) reporting that their child did not combine words compared with parents of typically developing children ($n = 2, 1.2\%$).

Procedure

Participants were recruited through professional networks, social media, and project partner websites. (e.g. Autism CRC, Autism Queensland and Brisbane City Council Libraries). Advertisements were placed on websites and/or social media pages. Given the method of recruitment, it was not possible to calculate a response rate. The advertisement contained information around how to access the online questionnaire associated with the study. The questionnaire was available for 3 months. The questionnaire took approximately 15 min to complete.

Measures

The parent survey used was based on the early literacy parent questionnaire developed by Boudreau (2005) consistent with the previous research by Westerveld and van Bysterveldt (2017). It included a total of 27 questions regarding early literacy (child response to reading books, response to print, and interest in letters), demographics of child and parent, and for the purposes of this study, additional questions regarding library visits, attendance of early literacy sessions, reasons for nonattendance of such sessions (checklist to indicate barriers present such as time), and interest in attending a 4–6 week early literacy (Storytime) program in a local library were included. Questions were a combination of frequency rating scales (e.g. *Does your child ask you to read to him/her?* With responses of never, seldom, sometimes, often, or

always), open-ended (e.g. child’s favourite two books), and checklist (e.g. reasons for never attending early literacy sessions if applicable from a list). Feedback on the face validity, content, structure, and completion duration of the survey was sought from the three registered speech pathologists and one parent of a 4-year-old child pre-data collection; minor edits were made accordingly for clarity. Post-feedback, the survey was uploaded to SurveyMonkey (online) for data collection.

Data Analyses

Initial screening was conducted on the data. Under 5% of data were missing and were missing completely at random (MCAR), Little’s MCAR test; $\chi^2(5) = 1.49, p = .914, ns$. Data were deleted listwise by analysis as allowable under these conditions (Tabachnick and Fidell 2007). No major violations of normality, nor influential outliers were detected. Consequently, parametric analyses were used for all analyses except number of books in home due to the ordinal categories used (Spearman’s rho consequently used). Statistics were adjusted where violations of Levene’s test for equality of variances were found, $p < .05$. Due to the exploratory nature of the current study, increased risk of type 1 errors was considered less of a concern than type 2 errors. Furthermore, a Bonferroni correction was deemed too conservative for the multiple comparisons (Perneger 1998). Thus, a p value of .05 was retained for all analyses. Cohen’s d (Cohen 1988) was reported as an effect size, interpreted as small = 0.2, moderate = 0.5, large = 0.8. For correlations, r was interpreted as follows: small = .1, moderate = .3, large = .5. Phi (φ) was reported as effect size for chi square analyses (small = 0.1, moderate = 0.3, large = 0.5). Effect sizes for ANOVA are reported as partial eta squared (η_p^2) interpreted as small = 0.0099, medium = 0.0588, or large = 0.1379 (Richardson 2011).

Preliminary analysis to ascertain whether parent education level, child gender, or child language ability were potential confounds between groups were conducted. No significant differences for gender were observed for any dependent variable (all $p > .05$). Parent education was significantly related to number of books in the home ($\chi^2(12) = 29.18, p = .004$,

Table 1 Demographic characteristics for children who have autism ($n = 41$) and typically developing ($n = 164$) groups ($N = 205$)

Demographic characteristic	Category	Autism n (%)	Typically developing n (%)
Gender (child)	Male	31 (75.6)	88 (54.7)
	Female	10 (24.4)	73 (45.3)
Parent education level	High school	5 (12.2)	4 (2.4)
	Trade qualification/diploma	6 (14.6)	22 (13.4)
	Bachelor’s degree	22 (53.7)	75 (45.7)
	Postgraduate qualification	7 (17.1)	59 (36.0)
	Other	1 (2.4)	4 (2.4)

$\varphi = 0.384$) only. As such, layered chi-squared analysis split by education level were conducted. Language ability (defined as speaking in phrases or not, based on parent report) was significantly related to all variables of interest, all $p < .05$, and thus post hoc follow-up comparisons controlling for language ability were conducted for significant planned a priori group comparisons.

Results

Similarities and Differences in Home Literacy Environment

Attendance at emergent literacy experiences ranged from never to very often on most items across both groups. Parents reported moderate interest in books (mean 3–4 on a 5-point scale) in each group, see Table 2. As predicted, typically developing children were reported to show greater interest in books, $t(48.01) = 2.40$, $p = .020$, $d = 0.51$. However, when language ability was controlled, the main effect of diagnosis showed no significant difference between groups on child interest in books, $F(1, 200) = 0.01$, $p = .924$, $\eta_p^2 < 0.001$. The main effect of language ability showed a significant difference between children who could and could not produce phrase speech, $F(1, 200) = 8.50$, $p = .004$, $\eta_p^2 = 0.041$, with children who produced phrase speech showing greater interest

in books ($M = 3.74$; $SD = 0.78$) compared with those children who could not produce phrase speech ($M = 2.80$; $SD = 1.47$). There was no significant interaction between child diagnosis and language ability, $F(1, 200) = 0.90$, $p = .345$, $\eta_p^2 = 0.004$.

Higher frequency of reading shared book, visiting the library, and attending early literacy sessions were observed in the typically developing group, see Table 2. There was a significant difference between the groups in frequency of shared book reading, $t(47.19) = 2.79$, $p = .008$, $d = 0.56$. Shared book reading was more frequent in the typically developing group compared with the autism group. However, when language ability was controlled, there was no main effect of diagnosis, $F(1, 201) = 0.10$, $p = .750$, $\eta_p^2 = 0.001$. There was a significant main effect of language ability, $F(1, 201) = 22.58$, $p < .001$, $\eta_p^2 = 0.101$. Children who produced phrase speech read more frequently ($M = 4.46$; $SD = 0.71$) than children who did not produce phrase speech ($M = 2.93$; $SD = 1.39$). There was no significant interaction between child diagnosis and language ability, $F(1, 201) = 0.005$, $p = .946$, $\eta_p^2 < 0.001$.

There was a range in the number of books in the home in each group, see Table 2. However, significant group differences were found in the number of children's books in the home, $\chi^2(3) = 13.92$, $p = .003$, $\varphi = 0.265$. Parents of typically developing preschoolers selected a category in line with more children's books in the home (81.3% reported > 50) than parents of preschoolers who have autism (52.6% reported > 50). Investigation of layered cross-tabulations showed a significant

Table 2 Parent-reported home literacy experiences and library attendance for children who have autism ($n = 41$) and typically developing ($n = 164$) groups

Survey questions	Autism		Typically developing	
	<i>M</i> (<i>SD</i>)	Range	<i>M</i> (<i>SD</i>)	Range
Child interest in books ^{a*}	3.29 (1.21)	1–4	3.77 (0.75)	1–5
Frequency of shared book reading ^{b*}	3.90 (1.22)	1–5	4.46 (0.72)	2–5
Frequency visit the library ^{c*}	2.51 (1.36)	1–5	3.24 (1.20)	1–5
Attend early literacy session at library ^{d*}	1.59 (0.85)	1–4	2.28 (1.02)	1–5
	<i>n</i> (%)		<i>n</i> (%)	
Number of children's books in home ^{e*}		1–4		1–4
Less than 10	1 (2.6)		1 (0.6)	
Between 11 and 20	6 (13.2)		9 (5.6)	
Between 21 and 50	12 (31.6)		20 (12.5)	
More than 50	20 (52.6)		130 (81.3)	
Reason for not attending early literacy sessions				
Time	9 (22.0)		62 (37.8)	
Unaware of initiative	2 (4.9)		7 (4.3)	
Parent not interested	2 (4.9)		6 (3.7)	
Child not interested*	9 (22.0)		10 (6.1)	
Transport issues	0 (0.0)		1 (0.6)	
Environment not suitable*	14 (34.1)		6 (3.7)	

^a_{abcd} ^{*}^e Scale from 1 (least favourite) to 5 (most favourite); ^{*} Scale from 1 (never) to 5 (very often); indicates significant group differences before controlling for language ability, $p < .05$ or parental education

Table 3 Correlations between library attendance, early literacy session attendance, and home literacy environment for autism ($n = 41$) and typically developing ($n = 164$) groups

	1	2	3	4	5
Children who have autism					
1. Visit the library	-	.49**	.45**	.56***	0.40 ^a
2. Attend early literacy sessions		-	.34*	0.25	0.43 ^a
3. Child interest in books			-	.68**	0.57 ^a
4. Frequency of shared book reading				-	0.54 ^a
5. Number of books in home					-
Typically developing children					
1. Visit the library	-	.50**	.17*	.28**	0.22 ^a
2. Attend early literacy sessions		-	.21**	.22**	0.19 ^a
3. Child interest in books			-	.35**	0.16 ^a
4. Frequency of shared book reading				-	0.34 ^a
5. Number of books in home					-

^a Spearman’s rho

* $p < .05$; ** $p < .01$; *** $p < .001$

association between diagnosis and the number of children’s books in the home for those with a postgraduate education, $\chi^2(3) = 9.42, p = .024, \varphi = 0.381$, with greater numbers of postgraduate, parents in the typically developing group reported 50 or more children’s books in the home ($n = 49$) compared with the autism group ($n = 3$). All other education levels showed no significant associations between diagnosis and number of children’s books in the home. Due to cell sizes less than 5, it was not possible to control for language ability for further follow-up.

Frequency and Barriers to Attending Community Libraries and Early Literacy Sessions

As predicted, significant group differences were found in parent-reported library attendance, $t(197) = 3.32, p = .001, d = 0.57$. Parents of typically developing children reported more frequently attending the library compared with parents of children who have autism, see Table 2. When language ability was controlled, there was no main effect of diagnosis on library attendance, $F(1, 195) = 0.27, p = .602, \eta_p^2 = 0.001$. There was, however, a significant main effect of language ability for library attendance, $F(1, 195) = 10.22, p = .002, \eta_p^2 = 0.050$. Children who produced phrase speech attended the library more frequently ($M = 3.20; SD = 1.22$) compared with children who did not produce phrase speech ($M = 1.87; SD = 1.19$). There was no significant interaction between child diagnosis and language ability, $F(1, 195) = 2.50, p = .116, \eta_p^2 = 0.013$.

As predicted, significant group differences were found for early literacy session attendance, $t(197) = 3.87, p < .001, d =$

0.73. Parents of typically developing children reported more frequently attending early literacy sessions compared with parents of children who have autism, see Table 2. When language ability was controlled, there was no main effect of diagnosis on early literacy session attendance, $F(1, 195) = 0.006, p = .938, \eta_p^2 < 0.001$. There was also no main effect of language ability, $F(1, 195) = 2.14, p = .15$, and no significant interaction was found between child diagnosis and language ability, $F(1, 195) = 3.45, p = .065, \eta_p^2 = 0.017$.

Parent-reported reasons for not attending early literacy sessions at the local library were mixed, see Table 2. There were no group differences for parent lack of time ($\chi^2(1) = 3.64, p = .056, \varphi = -0.133$); being unaware of the initiative ($\chi^2(1) = 0.03, p = .865, \varphi = 0.012$); lack of parent interest ($\chi^2(1) = 0.13, p = .718, \varphi = 0.025$); or transport issues ($\chi^2(1) = 0.25, p = .616, \varphi = -0.035$).

Significant differences were found in parent-reported lack of child interest ($\chi^2(1) = 9.80, p = .002, \varphi = .219$) with parents of children who have autism more likely to endorse that (lack of) child interest was a barrier to attending early literacy sessions. To control for the impact of the presence/absence of phrase speech, comparisons for child interest were then made excluding children without phrase speech. When including only those children with phrase speech, a significant difference remained for lack of child interest, $\chi^2(1) = 4.48, p = .03, \varphi = 0.15$ with a higher proportion of parents of children who have autism (5/28, 18%) endorsing this as a reason for not attending compared with parents of typically developing children (10/162, 6%). Due to small cell sizes, it was not possible to compare typically developing children with no phrase speech with children who have autism with no phrase speech.

Significant differences were found in unsuitability of the environment ($\chi^2(1) = 34.63, p < .001, \varphi = 0.411$). Parents of children who have autism were more likely to endorse that unsuitability of the environment was a barrier to attending early literacy sessions. To control for the impact of the presence/absence of phrase speech, comparisons for (un) suitability of the environment were then made excluding children without phrase speech. A significant difference remained for unsuitability of the environment, $\chi^2(1) = 37.10, p < .001, \varphi = 0.44$ with a higher proportion of parents of children who have autism (11/28, 39%) reporting this was a barrier compared with parents of typically developing children (6/162, 4%). Due to small cell sizes, it was not possible to compare typically developing children with no phrase speech with children who have autism with no phrase speech.

Associations Between Library Attendance and Home Literacy Environment

Correlations between frequency of library visits, early literacy session attendance, child interest in books, and frequency of shared book reading in the home were

conducted, split by group, see Table 3. Similar associations were observed within each group. Parents who reported attending the library more frequently also attended early literacy sessions more frequently, regardless of diagnostic group. Differences emerged between the groups on the strength of associations between parent reported frequency of home shared book reading, child interest in books, and frequency of library visits/early literacy session attendance. Significant associations were found between frequency of library attendance and frequency of shared book reading for both groups; however, these varied in strength, with a strong association for the autism group compared with moderate for the typically developing group. Further analysis, using the Fisher r - z transformation indicated that this was not significantly different, $z = -1.85$; $p = .064$. Significant associations were found between the frequency of library attendance and child interest in books for both groups. These varied in strength with a strong association for the autism group and weak for the typically developing group, although the difference was non-significant, $z = 1.64$; $p = .101$.

Discussion

Early literacy experiences across home and community libraries are important for promoting emergent literacy development for all children. To date, limited research (for an exception, see Prendergast 2016) has explored whether children who have autism, who as a group are at high risk for later literacy challenges (Arciuli et al. 2013; Jones et al. 2009; Nation et al. 2006; Ricketts 2011), attend such sessions. As such, we explored via a parent survey the early literacy experiences of children (2–5 years) who have autism and typically developing peers, and investigated similarities and differences in the home literacy environment, visits to the library and attendance at early literacy sessions, and links between home literacy and library attendance.

Emergent Literacy Experiences

A rich home literacy environment was reported overall across groups; however at an individual level, variability was observed within both groups. More than 80% of parents reported that they had more than 20 children's books in the home in both groups. The number of books in the home was associated with parent education, with those with a higher level of education reporting owning more children's books within each group. Research in typically developing children has shown home literacy environments, including the number of books in the home may vary by socio-economic status (Bracken and Fischel 2008; Sénéchal et al. 1998). The mean frequency of shared book reading and parent reported child interest in book

reading for the autism group was similar to previous research into the home literacy environment of preschoolers who have autism (Westerveld and van Bysterveldt 2017).

Initial comparisons suggested more frequent home literacy experiences for the typically developing group compared with the autism group, with the exception of number of books in the home. Consistent with the previous research, children who have autism showed lower interest in books than those who do not have autism, and parents of children who have autism reported a lower frequency of shared book reading with their child than parents of typically developing preschoolers (Dybia et al. 2014). However, follow-up comparisons suggested differences were due to language ability, as controlling for the presence of phrase speech led to most comparisons being non-significant. This suggests that group differences in home literacy experiences may be related to language ability, as opposed to diagnosis per se, and is in line with previous research reporting reduced frequency of parental shared book reading with their preschoolers with language impairment (Boudreau 2005). Although we cannot determine causality, it seems plausible that parents of preschoolers with limited spoken language skills may find it more difficult to adapt their shared book reading sessions to meet their child's needs (Crowe 2000). Alternatively, less frequent exposure to story books in the home may be linked to lower language ability. Child interest and book reading frequency were moderately correlated within each group. Whether lower interest led to lower frequency of reading in the children who have autism group, or whether exposure to reading may promote greater interest is an important question for future research to better understand these group differences.

Library and Emergent Literacy Sessions

Consistent with our hypotheses, parents of children who have autism reported visiting the library less often and attending early literacy sessions less often than the parents with typically developing preschoolers. In both groups, time was identified as one of the main reasons for not attending these sessions. Group differences in attendance seemed to be linked to language ability as differences were non-significant once language ability was controlled. However, beyond language ability, there were two barriers more significantly endorsed by parents of children who have autism compared with typically developing children, unsuitability of the environment (34.1%, 3.7%, respectively) and child not interested (22%, 6.1%, respectively). This difference held after controlling for language ability level and when comparing only those children with phrase speech. The identification of unsuitability of the environment as a significant barrier to attend the library services for children who have autism suggests that parents perceive the library environment as unsupportive for their child. Previous research has indicated that parents of children who

have autism viewed the sessions as important and were happy to persevere, but that these environmental challenges affected their willingness to attend, which ultimately led to nonattendance (Lam et al. 2010; Prendergast 2016). Although we did not ask the parents in the current survey to explain their answers to this barrier question, several reasons can be put forward. The nature of the early literacy sessions may be problematic for children who have autism as it tends to be a group situation, requiring social communication skills, as well as potential physical crowding (Prendergast 2016). Poorer socio-emotional ability and communication skills, and difficulties managing the sensory environment, all of which are often reported in children who have autism, are factors that have been identified as restricting children's participation in community activities (Schaaf et al. 2011). In particular, difficulties managing the sensory environment restrict participation in community activities for children who have autism (Chien et al. 2017; Schaaf et al. 2011). Taken together, these factors may clearly reduce the child's interest in attending the session and may explain why the parents reported this as a major barrier to attending library sessions.

Links Between Home and Library

The child's interest in books appears to be a key factor influencing the participation of children in shared book reading and attending early literacy sessions. Interest in literacy activities has been identified as being reduced in children who have autism compared with typically developing peers (Dydia et al. 2014), and children with other developmental disabilities (Westerveld and van Bysterveld 2017). This may have negative implications for children who have autism who may be perceived by their parents to show lower interest (in books and attending the library), which may lead to both parents and children missing out on these important social interactions and literacy learning experiences. The implication of this is that parents also miss the opportunity to learn strategies to promote their child's early language and literacy skills in the home, placing these children at risk of missed future experiences. For children who have language impairments, these missed opportunities are likely to exacerbate challenges and lead to ongoing disadvantage with early language delays linked to later academic challenges especially in the area of reading development. This may be compounded in the case of children who have autism with additional needs arising from autism.

Limitations and Future Directions

We provide a novel contribution to the literature in exploring early literacy environments in home and community to identify factors which may impact the development of literacy-rich experiences for young children who have autism and add to

the emerging body of research into emergent literacy in autism (for a review see Westerveld et al. 2016). Nevertheless, limitations are acknowledged. First, we focused on quantitative differences between groups as reported by caregivers. Future research including qualitative experiences as well as child perspectives, for example through child interviews or direct observations, would be valuable in understanding the perspective of children engaging in shared book reading and early literacy sessions. This would add valuable information to identify, and address factors not included in the questionnaire that may pose barriers to the participation of children who have and do not have autism in community literacy experiences such as library visits and/or early literacy sessions.

Second, we did not directly evaluate language ability, but relied on parent dichotomous report of phrase speech vs no phrase speech. However, this was an important distinction, as it appeared to explain differences in interest in books and frequency of shared book reading in the home. Consistent with this, different profiles of interest in emergent literacy experiences have previously been identified in children who have autism who displayed varying levels of language skills (Lanter et al. 2012; Lucas and Norbury 2018). Future research including direct formal assessments of both receptive and expressive language ability as well as emergent literacy skills, including comparison groups with developmental language disorders would provide valuable insights into the perhaps conditional associations between language ability, autism traits, home literacy environment, and emergent literacy skills (see Petrill et al. 2014).

Specific personal (child interest) and environmental (suitability of the library environment) factors were identified as differences in the emergent literacy environments of preschool children who have autism compared with their typically peers. Engaging children who have autism in meaningful early literacy experiences to facilitate emerging literacy skills is paramount to their long-term academic outcomes. Creating autism-friendly story book sessions that engage child interest in a supportive environment are important for providing children who have autism as well as their parents the opportunity to engage in these community activities.

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Author Contributions KS collaborated with the design and execution of the study, assisted with the data analysis, and wrote the paper. JP collaborated with the design and execution of the study, analysed the data, and collaborated with the writing of the study. RW analysed the data and wrote part of the results. MW collaborated with the design and managed the execution of the study, helped conceptualize the analysis, and assisted in writing of the paper.

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Compliance with Ethical Standards

Conflict of Interest The authors declare that they have not conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with ethical standards of the National Statement on Ethical Conduct in Human Research. This study was approved by the Griffith University Human Research Ethics Committee (2017/391).

Informed Consent Informed consent was obtained from all participants.

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