

# A preliminary investigation of parent-reported fiction versus non-fiction book preferences of school-age children with autism spectrum disorder

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## Abstract

**Background & aims:** Anecdotal evidence suggests that individuals with autism spectrum disorder prefer non-fiction books over fiction books. The current study was the first to investigate parent-reports of children with autism spectrum disorder's fiction and non-fiction book preferences and whether these relate to individual differences in social communication, oral language, and/or reading abilities.

**Method:** Children (ages 8–14 years,  $M = 10.89$ ,  $SD = 1.17$ ) with autism spectrum disorder diagnoses ( $n = 19$ ) and typically developing peers ( $n = 21$ ) participated. Children completed standardized measures of social communication, oral language, and reading abilities. Parents reported children's current favorite book, and from these responses, we coded children's fiction versus non-fiction book preferences.

**Main contribution:** Contrary to anecdotal evidence, children with autism spectrum disorder preferred fiction similar to their typically developing peers. Fiction versus non-fiction book preference was significantly related to social communication abilities across both groups. Children's oral language and reading abilities were related, as expected, but the evidence for a relationship between social communication and reading comprehension was mixed.

**Conclusions:** This study provides preliminary evidence supporting the association of social communication in fiction versus non-fiction book preference, which may be related to children's comprehension and support the theoretical role of social communication knowledge in narrative/fiction.

**Implications:** It should not be assumed that *all* children with autism spectrum disorder prefer expository/non-fiction or do not read narrative/fiction. Children who prefer non-fiction may need additional social communication knowledge support to improve their understanding of narrative fiction.

## Keywords

Autism spectrum disorder, social communication, reading, oral language, reading comprehension, school-age

Autism spectrum disorder (ASD) is a neurodevelopmental disorder characterized by (1) social communication impairments and (2) restricted and repetitive behaviors, activities, and interests (*Diagnostic Statistics Manual, Fifth Edition* (DSM-5); American Psychiatric Association, 2013). Various studies report that reading comprehension is impaired in 38–73% of children with ASD who can read some words

(Davidson & Ellis Weismer, 2014; Henderson, Clarke, & Snowling, 2014; Jones et al., 2009; McIntyre, Solari, Grimm, et al., 2017; Nation, Clarke, Wright, & Williams, 2006; Ricketts, Jones, Happé, & Charman, 2013). Previous studies used a developmental theory of reading, the simple view of reading (Gough & Tunmer, 1986; Hoover & Gough, 1990; Tunmer & Chapman, 2012), and confirmed that, similar to

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typically developing (TD), or neurotypical children, word reading and oral language abilities predict reading comprehension for individuals with ASD (Brown, Oram-Cardy, & Johnson, 2013; Cronin, 2014; Davidson & Ellis Weismer, 2014; Henderson et al., 2014; Jacobs & Richdale, 2013; McIntyre, Solari, Gonzales, et al., 2017; Nation et al., 2006; Norbury & Nation, 2011; Ricketts et al., 2013). Although word reading and oral language are important predictors of reading comprehension, growing evidence suggests that social communication knowledge, which is inherently poor for individuals with ASD, may also contribute to reading comprehension (Brown et al., 2013; Jones et al., 2009; Ricketts et al., 2013). However, relatively few studies have investigated the role of social communication abilities in reading comprehension; this factor may help to account for the disproportionately high reading comprehension impairments for individuals with ASD.

Social communication is conceptualized as a broad range of factors necessary for interacting with others in social situations (American Speech-Language-Hearing Association (ASHA), n.d.). This broad conceptualization results in inconsistent reference across studies (Norbury, 2014), but its use is largely related to measurement challenges, in that current measures of social communication do not separate factors related to social communication such as, eye contact use, facial expression and body language understanding, social cognition, social interaction, and pragmatics. Norbury (2014) categorized social communication measures into three types: (1) parent or teacher report, (2) structured observation, or (3) formal assessment, and pointed out that the *Children's Communication Checklist, Second Edition* (CCC-2; Bishop, 2003), a parent-report measure, "... has rapidly become the most widely used, standardized measure of pragmatic ability in research and clinical contexts" (p. 205). Like many others, we also relied on parent-report measures of social communication, so in this paper, we use the broad definition to collectively refer to factors related to social communication. Also, as a related but specific factor in social communication, we refer to theory of mind, or understanding of one's own and other's mental states. Theory of mind is widely documented to be poor in many but not all individuals with ASD (see Boucher, 2012 for review). Although theory of mind is broadly defined, the term most often refers to success on false belief tasks, which is consistent with our use of the term in this paper (Boucher, 2012).

Autism symptomatology (including social communication and theory of mind) may be related to the specific reading comprehension deficits observed in those with ASD. For instance, autism symptomatology in a

group of children with specific language impairment (SLI; i.e., those children who did not have ASD diagnoses but who had more autism-like features) had worse reading comprehension over time compared to their SLI peers with less or no autism symptomatology, suggesting that autism symptoms were related to poorer reading comprehension beyond the effects of language impairments on reading comprehension (St Clair, Durkin, Conti-Ramsden, & Pickles, 2010). In another large sample of children with ASD, McIntyre, Solari, Grimm, et al. (2017) documented that the lowest readers in their sample of children with ASD (8–16 years) had the highest ASD symptomatology. However, ASD symptomatology did not significantly predict reading comprehension after accounting for higher-order language skills (understanding of implied meanings, idioms, and abstractions, making inferences, narrative story recall, and local and global sentence processing) in children with ASD (8–16 years; McIntyre, Solari, Gonzales, et al., 2017). This finding suggests that higher-order language skills mediate the relationship of ASD symptomatology and reading comprehension. However, this was not directly examined and needs further consideration given the number of components collectively referred to as higher-order language skills and that autism symptomatology collapses social communication and restricted and repetitive behavior constructs.

We now consider the relationships of poor social communication and theory of mind in reading comprehension in ASD. Poor social communication (based on the ADOS Social Communication subscale) was related to the discrepancy between reading comprehension and cognitive abilities in adolescents with ASD (14–16 years) in one study (Jones et al., 2009). Another study demonstrated that social communication abilities accounted for an additional 3% of the variance in reading comprehension, after accounting for word reading and oral language abilities, in adolescents with ASD (14–16 years) (Ricketts et al., 2013). Considering the role of theory of mind more specifically, Ricketts, Jones, Happé, and Charman (2013) found that one theory of mind task (Strange Stories; Happé, 1994) predicted roughly 5% of the variance in reading comprehension but a second theory of mind task (Frith-Happé Animations; Abell, Happé, & Frith, 2000; Castelli, Happé, Frith, & Frith, 2000) was not a significant predictor of reading comprehension. McIntyre et al. (2018) replicated the significant prediction of the Strange Stories task in reading comprehension and found that the Silent Films task (Devine & Hughes, 2013) also significantly predicted reading comprehension in children with ASD (9–17 years). Together, this handful of studies provides growing evidence of social communication and theory of mind, in addition to word reading

and oral language, contributing to reading comprehension in individuals with ASD.

Evidence for the connection between social communication, theory of mind, and reading comprehension is also emerging in neurotypical children. For instance, young children prefer stories about people, or animate protagonists, which aligns with the notion that fiction is a source of information about the minds of others and promotes understanding of mental states, that is, theory of mind (Barnes & Bloom, 2014). In addition, theory of mind both directly and indirectly through higher-order language measures predicts the development of reading comprehension skills in preschoolers and kindergarteners (Atkinson, Slade, Powell, & Levy, 2017; Kim, 2015). Also, social-cognitive development has been shown to contribute to increasingly successful understanding of a story's social-cognitive aspects in older school-age individuals (Pavias, van den Broek, Hickendorff, Beker, & Van Leijenhorst, 2016). Finally, in the other direction, listening to storybooks and answering questions about mental states improved preschoolers' theory of mind (Guajardo & Watson, 2002), and adults' theory of mind improved after reading literary fiction compared to non-fiction (Black & Barnes, 2015). See Oatley (2016) for a review of additional studies on the relationship of social communication knowledge and narrative fiction in neurotypical individuals.

With increasing empirical evidence of the contribution of theory of mind in reading comprehension, the Direct and Indirect Effects model of Reading (DIER) builds on the simple view of reading by specifying a hierarchical structure of component skills, including theory of mind, with direct and indirect effects (Kim, 2017). More broadly, Oatley and colleagues theorize that narrative fiction, as opposed to explanatory non-fiction, simulates and abstracts the social world through which readers can experience the thoughts and emotions of characters and gain insights and understanding of complex social situations (Mar & Oatley, 2008; Oatley, 2016). The Social Processes and Content Entrained by Narrative (SPaCEN) framework (Mar, 2018) proposes potential accounts for how reading narrative stories enhances social cognition. Together, these frameworks support predictions that social communication is necessary to understand narrative fiction and that understanding narrative fiction improves social communication, particularly social cognition. In other words, these theories suggest a reciprocal relationship between social communication knowledge and understanding narrative fiction, which was supported in a recent study finding that development of reading comprehension and social communication (based on teacher report) across first grade were reciprocally related (Sparapani et al., 2018).

In summary, previous studies suggest a relationship between social communication and reading comprehension in TD children, children with SLI, and children with ASD. This growing body of empirical evidence has supported the proposal of several models and frameworks detailing the relationship of theory of mind and social communication in reading comprehension. However, many of these empirical studies have not distinguished between the effects of social communication relative to reading material (e.g., expository versus narrative, non-fiction versus fiction), which is relevant for determining the specific role of social communication in reading comprehension.

In neurotypical individuals, narrative texts are generally considered easier to comprehend than expository texts (Graesser & McNamara, 2011), but some evidence indicates that reader characteristics (e.g., word reading, oral language, and background knowledge) differentially predict performance across text genre (narrative, expository, or functional) and question type (literal versus inferencing) (Eason, Goldberg, Young, Geist, & Cutting, 2012). If we consider social communication knowledge as a type of background knowledge, then we would predict that individuals with weak social communication knowledge, such as individuals with ASD, would have poorer comprehension of narrative texts relative to expository texts. The relationship of social communication knowledge relative to text type has not been thoroughly investigated, but has important theoretical and clinical implications.

Anecdotally, clinicians and parents report that children with ASD prefer non-fiction books over fiction books. In a meta-analysis on reading comprehension for individuals with ASD, Brown, Oram-Cardy, and Johnson (2013) mentioned that performance on non-social texts was better than social texts, but the authors provided no evidence for how this was coded or how other contributing factors were controlled. Only one study has investigated fiction versus non-fiction book preference in adults with ASD. Barnes (2012) asked adults with ASD and neurotypical college undergraduates to rank short descriptions of four possible texts from the one they would most to least like to read. Text descriptions were either fiction about people, fiction about an object, a biographical story (non-fiction about a person), or an encyclopedia entry about an object (non-fiction about an object). Comparisons were made separately within each group. Neurotypical adults showed a strong preference for texts about people, which has also been documented in neurotypical children (Barnes & Bloom, 2014). The adults with ASD preferred descriptions about non-fiction texts about objects relative to fiction texts about objects, but no preference was found for texts about people (fiction or non-fiction). Therefore, adults with

ASD showed a preference for non-fiction texts about objects, but did not avoid texts with social content.

The current study is a preliminary investigation of parent-reported fiction versus non-fiction preference in children (8–14 years) with ASD relative to TD peers using secondary data analysis from information collected as part of another study focused on children's reading abilities. We compared children's fiction versus non-fiction book preference across groups, and we also examined whether children's book preference was related to their social communication or oral language abilities. In addition, we investigated, in these same children, the relationships of oral language and social communication with a standardized measure of word reading and reading comprehension. Specifically, our research questions were:

1. Do parent's reports of children's fiction and non-fiction book preference differ for the ASD and TD groups?;
2. Is fiction or non-fiction book preference related to a child's social communication abilities or their oral language abilities?; and
3. Are oral language and social communication in these same children related to a standardized measure of word reading or reading comprehension?

We hypothesized that children with ASD relative to their TD peers would prefer non-fiction relative to fiction books. Furthermore, we hypothesized that children's preferences would be related to their social communication abilities but not their oral language abilities. We also expected that word reading, oral language, and passage comprehension abilities would be strongly interrelated and that social communication would be related to passage comprehension but not word reading abilities.

## Method

### Participants

Participants were recruited through local schools, community centers, or clinics using flyers and website postings and through a research registry at the Waisman Center (ASD group only) for a larger project examining the relationship of oral language and executive function abilities across monolingual TD, bilingual TD, children with SLI, and children with ASD (see Ellis Weismer et al., 2017; Gangopadhyay, Davidson, Ellis Weismer, & Kaushanskaya, 2016; Haebig, Kaushanskaya, & Ellis Weismer, 2015; Kaushanskaya, Park, Gangopadhyay, Davidson, & Ellis Weismer, 2017 for published studies including some of these participants). After participating in the larger study, the monolingual TD participants and

participants with ASD were recruited to participate in a second study upon additional informed parental consent and child/adolescent assent (see Davidson & Ellis Weismer, 2017; Davidson, Kaushanskaya, & Ellis Weismer, 2018 for published studies including similar participants). The university's institutional review board approved both research protocols.

In total, 50 children across the two groups (TD and ASD) were recruited for the current study. Children were between the ages of 8 and 14 years, which is comparable to previous studies on reading in individuals with ASD (e.g., McIntyre, Solari, Grimm, et al., 2017; Nation et al., 2006). All participants with ASD had previous medical or educational community ASD diagnoses. Exclusionary criteria for both groups included: non-native English/multi-lingual speaker, nonverbal cognition <85, known chromosomal abnormalities (e.g., Fragile X syndrome, Down syndrome), cerebral palsy, uncorrected hearing/visual impairments, or other disorders. All participants were also required to pass a pure tone audiometry hearing screening performed at 20 dB HL at the frequencies of 1000, 2000, and 4000 Hz, per ASHA (1997) guidelines. Additional exclusionary criteria for the TD group included: language impairment, learning disabilities, or other developmental delays.

Participant characteristics and group comparisons are reported in Table 1. Using Fisher's exact tests for count data, race/ethnicity did not significantly differ between ASD and TD groups, but groups significantly differed for sex. Given this significant difference, sex effects were further explored in relation to book preference (see results). Analysis of variance and generalized eta-squared ( $\eta_g^2$ ) effect sizes (Fritz, Morris, & Richler, 2012) were used and reported for the remaining continuous variables. Groups significantly differed on the two social communication measures, the parent-report language measure, and passage comprehension measure. Groups did not significantly differ in age, socioeconomic status based on mother's years of education, nonverbal cognition, vocabulary, morphological comprehension, or word reading abilities.

### Procedure

The hearing screening, nonverbal cognition, oral language measures, social communication measures, and additional measures not relevant to the current study were administered as part of the protocol of the larger research study across two, 2- to 3-h sessions. The assessments given in each session were held constant across participants, but the order of the assessments was randomized within each session across participants. The parent questionnaire, reading measures, and measures not relevant to the current study were administered as part of the current research study

**Table 1.** Group characteristics.

Variable	TD controls (n = 21)			ASD (n = 19)			Group comparisons		
	n	%		n	%		p		
Sex (male)	10	48		16	84		.022		
Race/Ethnicity (White)	18	86		17	89		>.999		
Variable	M	SD	Range	M	SD	Range	F	p	$\eta_g^2$
Age <sup>a</sup>	10.83	1.04	9.25–12.67	10.95	1.32	8.17–13.33	0.10	.754	0
SES	16.75	2.94	12.00–22.00	15.63	2.59	12.00–21.00	1.59	.216	0.04
WISC-IV	114.19	11.01	94.00–135.00	107.89	15.58	86.00–137.00	2.21	.145	0.06
SCQ	4.19	3.47	0.00–16.00	18.63	5.83	9.00–35.00	92.60	<.001	0.71
CCC-2 SIDI	1.52	5.42	–10.00–11.00	–8.21	8.39	–23.00–7.00	19.37	<.001	0.34
CCC-2 GCC	108.57	17.35	59.00–126.00	76.68	11.18	51.00–98.00	46.63	<.001	0.55
PPVT-4	118.81	17.15	97.00–150.00	108.26	19.97	81.00–141.00	3.23	.080	0.08
TOLD:I-4 MC	10.86	3.53	5.00–16.00	9.78	3.41	6.00–16.00	0.94	.339	0.02
WRMT-III WR	104.95	11.83	83.00–132.00	97.32	13.96	79.00–124.00	3.51	.069	0.08
WRMT-III PC	114.86	13.65	91.00–134.00	98.79	14.12	77.00–126.00	13.38	.001	0.26

ASD: autism spectrum disorder; CCC-2 GCC: *Children's Communication Checklist, Second Edition* (CCC-2) General Communication Composite; CCC-2 SIDI: CCC-2 Social Interaction Difference Index; PPVT-4: *Peabody Picture Vocabulary Test, Fourth Edition* standard scores; SCQ: *Social Communication Questionnaire* Total Score; SES: socioeconomic status (based on mother's years of education (as rough benchmarks, 12 years: high school education; 13–16 years: university undergraduate education, >16 years: graduate education) (TD: n = 20); TD: typically developing; TOLD:I-4 MC: *Test of Oral Language Development-Intermediate, Fourth Edition* Morphological Comprehension (MC) subtest scaled scores (ASD: n = 18); WISC-IV: *Wechsler Intelligence Scale for Children-Fourth Edition* Perceptual Reasoning Index; WRMT-III PC: *Woodcock Reading Mastery Test, Third Edition* (WRMT-III) Passage Comprehension (PC) standard scores; WRMT-III WR: WRMT-III Basic Skills cluster scores (WR: word reading).

<sup>a</sup>Chronological age in years.

protocol in a single 2- to 3-h session, and the assessment order was fixed. In both studies, all participants were tested individually in a quiet room at a research center, and offered breaks as needed. Assessments were administered by trained research assistants (TD group) or research-trained speech-language pathologists (ASD group).

## Measures

**Standardized measures.** Several parent-report and examiner-administered standardized measures were used to index nonverbal cognition, social communication, oral language, and reading abilities. The *Wechsler Intelligence Scale for Children, Fourth Edition* (WISC-IV; Wechsler et al., 2003) Perceptual Reasoning Index measured nonverbal cognition. For social communication, two parent-report measures indexed social communication abilities: the *Social Communication Questionnaire* (SCQ; Rutter, Bailey, & Lord, 2003) total score and the *Children's Communication Checklist, Second Edition* (CCC-2; Bishop, 2003) Social Interaction Difference Index (SIDI). We collected data from multiple sources to improve reliability for our language measures. We used the parent-report measure, the CCC-2 General Communication Composite (GCC) score, in addition to the examiner-administered

measures, the *Peabody Picture Vocabulary Test, Fourth Edition* (PPVT-4; Dunn & Dunn, 2007) and the *Test of Oral Language Development, Intermediate Version, Fourth Edition* (TOLD:I-4; Hammill & Newcomer, 2008) Morphological Comprehension subtest, to assess oral language abilities. Children were given either Version A or B of the PPVT-4, depending on the year they participated in the larger project.

To index reading abilities, we selected the *Woodcock Reading Mastery Test, Third Edition* (WRMT-III; Woodcock, 2011) because this measure is commonly used in the United States to assess reading comprehension both clinically and in research (e.g., Adlof, Catts, & Lee, 2010; Berninger, Abbott, Cook, & Nagy, 2016; Catts, Adlof, & Ellis Weismer, 2006; Catts, Hogan, & Fey, 2003; Christopher et al., 2012; Cronin, 2014; Cutting, Materek, Cole, Levine, & Mahone, 2009; Huemer & Mann, 2010; Ouellette, 2006; Quinn, Wagner, Petscher, & Lopez, 2015; Swanson & Berninger, 1995). Children's word reading abilities were assessed using the WRMT-III Basic Skills cluster score, which combines scores from the Word Identification and Word Attack subtests. Together, the Basic Skills cluster score indicates children's single word recognition and decoding abilities. Finally, children's reading comprehension was assessed using the WRMT-III Passage Comprehension subtest.

**Fiction versus non-fiction coding.** Parents reported children's favorite books in response to the question, "What is your child's current favorite book?," on a background questionnaire (see Appendix 1). Parent's responses were blinded so that group membership could not be identified and then coded by the first author using the following procedure. Book titles were searched in a local public library catalogue, and fiction versus non-fiction information was retrieved from the Subject and/or Genre fields. All subcategories of fiction, including historical fiction, fantasy, science fiction, spy fiction, and historical fantasy, were collapsed into the fiction category for the purposes of this study. In addition, titles classified as graphic novels, comics, or mangas (comics created in Japan) were coded as fiction because many of these stories follow a narrative arc (Gardner & Herman, 2011; O'English, Matthews, & Lindsay, 2006). If parents listed a topic rather than a specific book title, this was interpreted to indicate that children preferred expository non-fiction books about the given topic (e.g., "sports-related books," "Titanic," "books on rock science"). Several parents either did not report a favorite book, noted that they "didn't know," or noted that their child "doesn't have" a favorite book; all three responses were coded as missing/not available (NA). Finally, one parent reported a book title, but the reported title could not be found. This response was, therefore, coded as not available. The resulting coding scheme was: 0 = Non-fiction, 1 = Fiction, 2 = NA. Four children from the TD group and six children from the ASD group were missing a favorite book code; these participants were not included in the analyses, resulting in a final total sample size of 40 children (TD:  $n=21$ ; ASD:  $n=19$ ).

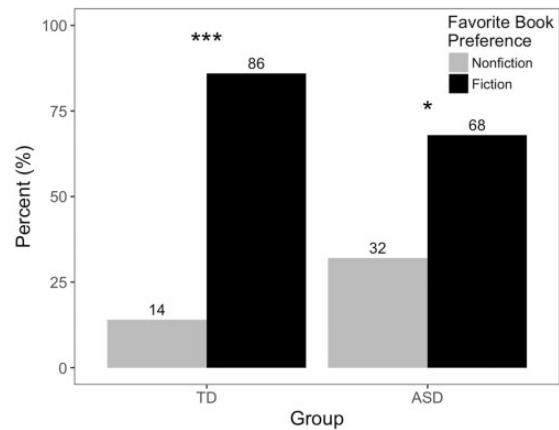
### Analysis approach

To determine the pattern of fiction and non-fiction book preferences for between-group comparisons, Fisher's Exact tests for count data were performed. Next, we separately evaluated whether the proportion of participants preferring fiction relative to non-fiction significantly differed for within-group comparisons using two-sided, two-sample tests for equality of proportions without continuity corrections and Cohen's  $h$  effect sizes. Finally, we examined Pearson's correlations collapsed across both TD and ASD groups to assess relationships and individual differences across all measures.

## Results

### Group comparisons

First, we examined differences by group (see Figure 1) using a Fisher's exact test to determine if children



**Figure 1.** Proportion (percent) of participants preferring non-fiction and fiction books separately within typically developing (TD) and autism spectrum disorder (ASD) groups.

with ASD significantly differed in book preference from their peers. The pattern of book preference was similar across TD and ASD groups ( $p=.265$ ). More children in the TD group preferred fiction to non-fiction ( $\chi^2(1)=21.43$ ,  $p<.001$ ,  $h=1.61$ ) and more children in the ASD group preferred fiction to non-fiction ( $\chi^2(1)=5.16$ ,  $p=.023$ ,  $h=0.74$ ). Second, we compared book preference in males and females in the TD group to assess the possible differences by sex using a Fisher's exact test, which was not significant ( $p=.587$ ). More males significantly preferred fiction (80%) to non-fiction ( $\chi^2(1)=7.20$ ,  $p=.007$ ,  $h=1.29$ ), and likewise, more females preferred fiction (91%) to non-fiction ( $\chi^2(1)=14.73$ ,  $p<.001$ ,  $h=1.92$ ).

### Correlations

See Table 2 for the correlation results. Children's preference for fiction versus non-fiction books was significantly related to their social communication abilities, as indexed by the SCQ and the CCC-2 SIDI measures. On the other hand, children's preference for fiction versus non-fiction books was not significantly related to their oral language abilities, regardless of whether the measure was indexed by parent-report (CCC-2 GCC) or clinician administered tests (PPVT-4 and TOLD:I-4 MC).

Turning to the standardized measures of reading, the SCQ was significantly related to passage comprehension, but was not significantly related to word reading abilities. The CCC-2 SIDI was not significantly related to either word reading or passage comprehension. The word reading, oral language, and passage comprehension measures were significantly interrelated as expected.

**Table 2.** Correlations.

	Favorite book	Age	SCQ	CCC-2 SIDI	CCC-2 GCC	PPVT-4	TOLD:I-4 MC	WRMT-III WR	WRMT-III PC
Favorite book <sup>a</sup>	–								
Age	0.08	–							
SCQ	–0.35*	0	–						
CCC-2 SIDI	0.32*	–0.06	–0.65***	–					
CCC-2 GCC	0.22	0.15	–0.80***	0.55***	–				
PPVT-4	0.06	0.10	–0.28	–0.10	0.39*	–			
TOLD:I-4 MC	0.09	0.16	–0.21	0.01	0.33*	0.55***	–		
WRMT-III WR	–0.04	0.08	–0.24	–0.08	0.32*	0.69***	0.43***	–	
WRMT-III PC	0.19	0.14	–0.42**	0.08	0.44**	0.76***	0.53***	0.68***	–

CCC-2 GCC: *Children's Communication Checklist, Second Edition* (CCC-2) General Communication Composite; CCC-2 SIDI: CCC-2 Social Interaction Difference Index; PPVT-4: *Peabody Picture Vocabulary Test, Fourth Edition* standard scores; SCQ: *Social Communication Questionnaire* Total Score; TOLD:I-4 MC: *Test of Oral Language Development-Intermediate, Fourth Edition* Morphological Comprehension (MC) subtest scaled scores (ASD:  $n = 18$ ); WRMT-III PC: *Woodcock Reading Mastery Test, Third Edition* (WRMT-III) Passage Comprehension (PC) standard scores; WRMT-III WR: WRMT-III Basic Skills cluster scores (WR: word reading).

<sup>a</sup>Favorite book preference (0 = non-fiction; 1 = fiction).

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

## Discussion

Anecdotally, it is often reported that children with ASD prefer expository/non-fiction books relative to narrative/fiction books. The current study investigated children with ASD's non-fiction/fiction book preferences relative to their TD peers, and how these book preferences related to social communication and oral language abilities. We found that children's book preferences were similar across our ASD and TD groups with more children in both groups preferring fiction to non-fiction. An analysis with the TD participants indicated the same pattern across males and females with both preferring fiction to non-fiction. Looking at individual differences across both groups, we found that children's book preference was significantly related to their social communication abilities but there were no significant relationships between book preference and oral language abilities. One of two measures of social communication was related to reading comprehension on a standardized measure, and neither social communication measure was related to word reading.

ASD and TD participant groups were similar in age, socioeconomic status, nonverbal cognition, oral language, and word reading, but significantly differed in sex, social communication, parent-reported communication (a combination of oral language and social communication abilities), and reading comprehension. Contrary to our predictions and anecdotal accounts, the pattern of book preference did not significantly differ for children with ASD and TD children: more individuals in both groups significantly preferred fiction

to non-fiction books. Although the pattern was the same across both groups, the magnitude of the effect was weaker for the ASD group than the TD group. In other words, children in both groups preferred fiction, but the difference in the proportion of the children who preferred fiction over non-fiction was much smaller in the ASD group. These results mostly align with Barnes (2012) in that we did not find a strong preference for non-fiction and that fiction was not avoided in the ASD group.

The effects of sex on fiction and non-fiction book preference are unclear, but current evidence suggests that these differences may arise from socialization through gendered stereotypes (Chapman, Filipenko, McTavish, & Shapiro, 2007; Summers, 2013). The TD and ASD groups significantly differed in the proportion of males to females, with the ASD group having significantly fewer females. Sex differences were further investigated in this sample, but we only examined for sex effects in the TD group provided the female sample was too small in the ASD group. Similar to our findings for the TD versus ASD comparison, the pattern of book preference did not significantly differ for TD males and females in that fiction was preferred to non-fiction in both groups. The similar pattern of preference for fiction suggests that sex does not appear to have affected our results.

Examining individual differences across groups in this study lead to a slightly different story. Although we did not find differences in fiction and non-fiction preference across diagnostic groups, individual differences in children's social communication abilities across both ASD and TD individuals was related to book

preference. More specifically, children with stronger social communication abilities preferred fiction books. Conversely, children with weaker social communication abilities preferred non-fiction books. These results reinforce the need to capture individual differences rather than strictly examining categorical group comparisons (Brock & Caruana, 2014). Furthermore, these results highlight that individual differences in social communication in all children is reflected to some degree in their book preferences, and may impact their comprehension of different types of text. The latter needs to be further investigated, a point we return to in the limitations and future directions.

In contrast to the relationship with social communication, children's fiction versus non-fiction book preference was *not* significantly related to any of the oral language or reading measures. This result confirms our hypothesis that although oral language abilities are important for reading, they do not impact book preference. In other words, fiction book preference is more strongly related to social communication abilities.

Finally, social communication was not related to word reading abilities, as expected. Alternately, the relationship of social communication and reading comprehension was not straightforward: one measure (the SCQ) was related to reading comprehension but the other measure (the CCC-2 SIDI) was not. We consider three potential explanations for these mixed findings.

First, the social communication measures were moderately but not strongly related to each other ( $r = -0.65$ ). This indicates that the tests are capturing somewhat different aspects of social communication, or perhaps, additional or other aspects of communication more generally, which leads to the second potential explanation. The SCQ was significantly and strongly related to the CCC-2 GCC, and both measures were similarly related to reading comprehension ( $r = -0.42$  and  $r = 0.44$ , respectively). This suggests that these "general communication skills" reflected in the SCQ may be driving the relationship of the SCQ with reading comprehension. These results, however, do not suggest that there is no relationship between social communication and reading comprehension because the third explanation is that the reading comprehension measure may require less social communication knowledge than other measures with longer and more narrative-like texts.

### *Limitations and future directions*

This study was exploratory in nature and was the first study to examine fiction versus non-fiction preference in relation to social communication and oral language skills in children with ASD. Our first limitation was that this was a secondary data analysis. For this

reason, we relied on parent-report as an indirect proxy of children's book preferences, which assumes that parents know and are accurately reporting their child's favorite book. However, even using an indirect proxy, we found significant effects, which substantiates future investigations using direct measures of book preference (i.e., asking children directly about their book preferences), additional measures of reading comprehension, and more specifically, comparisons of narrative and expository text comprehension, to provide further insights into the role of social communication and reading comprehension.

An additional limitation is that our study focused on a restricted range of children with ASD with no cognitive impairments and relatively intact language abilities. In one way, this focuses our implications for children who may fall under the radar because of their relatively high abilities in other areas supporting reading comprehension but who may still be struggling with reading comprehension related to their social communication impairments. However, the additional impact of concomitant intellectual disability and severe structural language impairments is unknown and may also influence children's book preference.

In considering how language impairments may impact book preference and comprehension, we know that narrative fiction texts are related to individual reader abilities but are generally considered easier to comprehend (Eason et al., 2012; Graesser & McNamara, 2011), and a child's reading ability predicts how much they choose to read (van Bergen et al., 2018). With this in mind, we hypothesize that children with ASD without language impairments may have a stronger preference for non-fiction because their strong structural language abilities allow them to access the more difficult language in expository texts. In contrast, we expect that children with ASD with language impairments may have a double whammy effect of oral language and social communication impairments. Fiction books should be easier to access based on the simpler language in these texts, so non-fiction books would be more difficult, and less likely to be read, for those individuals with language impairments. However, impairments in social communication make fiction books difficult. A child with ASD and language impairments whom has impairments in both oral language and social communication, may find both fiction and non-fiction books difficult and less likely to be read. In other words, the double whammy in children with ASD with language impairments may not result in a strong preference for either fiction or non-fiction because both types of texts are difficult to access.

Finally, we did not account for the role of restricted imagination and interests. Considering the role of restricted imagination in book preference, fiction is



more imaginative; therefore, children may prefer non-fiction to fiction because less imagination is necessary. Barnes (2012) also suggested this in their adult sample, but the role of imagination remains to be investigated. Moreover, restricted interests may impact book preference. For instance, a child's favorite book could be related to their restricted interests even if it is fiction (e.g., the book *The Polar Express* for a child who likes trains). Although we still need the data to support our argument, we expect a child will have higher social communication abilities if they are reading a fiction book related to their restricted interests compared to a child reading a non-fiction book related to their restricted interests (assuming equivalent language abilities). We would also posit that having a child read a fiction book about their restricted interest may serve as a bridge to reading other fiction books not related to their restricted interests. In this way, the fictional book about a restricted interest serves as an entry point into fictional narrative; once children become familiar with and gain social communication skills with fictional narratives this will allow them to read and engage in assigned texts not related to their restricted interest—an important educational and clinical goal. Again, there is much to be investigated in this area.

### Possible clinical implications

The current study was a preliminary investigation, and as we have alluded to in the Limitations and Future Directions section, this is an emerging area of study. That being said, we offer some tentative clinical implications. Clinicians may wish to consider the type of text they are asking a child to read and whether the child's social communication abilities may impact their understanding. In general, texts classified as narrative/fiction will require greater social knowledge. Clinically, it may be important not to assume that children with ASD prefer non-fiction because many children with ASD's favorite books were fictional. Clinicians may also be able to use this advantageously to address communication, language, and academic goals. Some children with ASD may prefer non-fiction, which may be related to their poor social communication abilities. Clinicians may consider introducing fiction books that progressively increase in social communication knowledge to help support these children's understanding of narrative fiction.

### Summary

The current study was the first to investigate children with ASD's preference for fiction versus non-fiction texts. Contrary to anecdotal evidence, ASD children preferred fiction similar to their TD peers. In contrast,

individual differences across fiction versus non-fiction, social communication, oral language, and reading indicated a specific relationship of fiction versus non-fiction book preference with social communication abilities. This study provides preliminary evidence supporting the role of social communication in fiction versus non-fiction book preference, which may be related to children's comprehension and supports the theoretical role of social communication knowledge in narrative/fiction.

### Authors' note

The data collected for this study were originally part of MMD's doctoral dissertation at the University of Wisconsin-Madison. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

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## Appendix I. Parent responses for their child's favorite book title.

				(continued)			
Count	Child group (ASD/TD)	Parent response	Status (included/excluded)	Count	Child group (ASD/TD)	Parent response	Status (included/excluded)
1	TD	Don't know	Excluded	27	ASD	<i>Eye Witness Book of Inventions</i>	Included
2	TD	<i>My Uncle Sam is Dead</i> <sup>a</sup>	Included	28	ASD	NA	Excluded
3	TD	<i>Alex Rider</i>	Included	29	ASD	<i>Heroes of Olympus</i> series	Included
4	TD	NA	Excluded	30	ASD	Any Manga related books	Included
5	TD	NA	Excluded	31	ASD	NA	Excluded
6	TD	<i>Where the Mountain Meets the Moon</i>	Included	32	ASD	Anything non-fiction	Included
7	TD	<i>A Wrinkle in Time</i>	Included	33	ASD	<i>Rush Revere</i> series	Included
8	TD	<i>Amulet</i>	Included	34	ASD	<i>The Perfect Nest</i>	Included
9	TD	<i>Dragon Quest-Wings of Fire</i> series	Included	35	ASD	Book on rock science	Included
10	TD	<i>Harry Potter</i>	Included	36	ASD	<i>Junni McBee</i> <sup>c</sup>	Excluded
11	TD	<i>How to Train Your Dragon</i>	Included	37	ASD	<i>Sarah Plain and Tall</i>	Included
12	TD	NA	Excluded	38	ASD	<i>Narnia</i>	Included
13	TD	<i>The Book Thief</i>	Included	39	ASD	<i>Monster High</i>	Included
14	TD	<i>The Hobbit; The Maze Runner</i> <sup>b</sup>	Included	40	ASD	Series of Fudge Books <sup>d</sup>	Included
15	TD	Titanic	Included	41	ASD	<i>Wings of Fire</i> series	Included
16	TD	Sports-related	Included	42	ASD	<i>Harry Potter</i>	Included
17	TD	<i>Hatchet</i>	Included	43	ASD	Minecraft	Included
18	TD	<i>Magic Tree House</i> series	Included	44	ASD	Periodicals	Included
19	TD	<i>Harry Potter</i>	Included	45	ASD	<i>Diary of a Wimpy Kid</i>	Included
20	TD	<i>Ranger's Apprentice</i>	Included	46	ASD	NA	Excluded
21	TD	<i>The Sea of Trolls</i> trilogy	Included	47	ASD	A Minecraft book	Included
22	TD	<i>Harry Potter</i>	Included	48	ASD	Doesn't have one	Excluded
23	TD	<i>Harry Potter</i>	Included	49	ASD	<i>Amulet</i> series	Included
24	TD	<i>Ever After High</i>	Included	50	ASD	Comic Books	Included
25	TD	Minecraft	Included				
26	ASD	Whatever he is reading (no favorite)	Excluded				

(continued)

Note. All parent responses are indicated as parents reported them.

<sup>a</sup>Actual title: *My Brother Sam is Dead?*.

<sup>b</sup>The first title was coded.

<sup>c</sup>This book title could not be found.

<sup>d</sup>Refers to the Fudge Book series by Judy Blume.