THE COMMUNICATION CONTRIBUTION OF CHILDREN LEARNING TO USE SPEECH GENERATING DEVICE DURING PARENT-CHILD SHARED BOOK READING

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The purpose of this research is to examine the nature of parent-child interactions for elementary-aged children (K-4th grade) who have complex communication needs and are learning to use speech generating devices. Data come from a larger longitudinal mixed method study focused on language and literacy learning of children with complex communication needs during the COVID-19 pandemic. Participants are 18 families who participated in the larger study whose children had access to a speech generating device at home. Video observational data were collected during parent-child interactions during everyday home routines (e.g., shared reading, other routines). Data will be coded using SALT and then analyzed using SPSS. Findings showed the heterogeneity of how children communicate based on frequency of communication and how frequency relates to other aspects of their communication, providing varied opportunities for parents to respond. The varied frequency patterns allowed for grouping of children into three groups, to reveal across group communication based on form, topic responsivity, function, and focus. Important insight from this study revealed information that can help shape the development of more effective interventions to support the communication of children with complex communication needs, especially at home.

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CHAPTER I

INTRODUCTION

Communication is a fundamental human right that enables people to express their feelings and needs, and it also facilitates interactions with others (Brady et al., 2016). Yet, many children with disabilities have significant communication difficulties; therefore, people around them will need to protect and promote their right to communicate. The term complex communication needs is used to describe individuals who have little to no use of functional verbal speech to meet their daily communication needs (Beukelman & Light, 2020). Children with a variety of disability diagnoses, including autism, Down syndrome, intellectual disability, cerebral palsy, Fragile X syndrome, Angelman syndrome, and other disabilities are apart of a heterogeneous group of children with complex communication needs (Beukelman & Light, 2020).

Children with complex communication needs can use augmentative and alternative communication to support their language and development (ASHA, 2022a). Having effective communication is important for children because it promotes their functioning and participation in their natural environments like school and home (ASHA, 2022a; Biggs et al., 2018; Morin et al., 2018). AAC is an overarching term which refers to ways of communicating beyond verbal speech, and it includes aided AAC and unaided AAC. Unaided AAC refers to ways of communicating that do not require external tools outside of one's body (e.g., sign language, gestures, or facial expressions), whereas aided AAC involves external tools, such as the use of

picture symbols, communication boards, communication books, or speech generating devices (Beukelman & Light, 2020). Aided AAC systems range widely in the nature of the technology used, from low-technology to high-technology. Low-technology aided AAC systems do not require batteries (e.g., picture symbols, communications boards, or books, or real or partial objects). In contrast, high-technology AAC refers to speech generating devices, which may be dedicated communication devices or non-dedicates, such as tablet computers (e.g., iPads) with AAC applications. In either case, speech generating devices produce speech output based on buttons that show icons or text, or both. (ASHA, 2022a; Beukelman & Light, 2020; Da Fonte & Boesch, 2019).

A sizeable and ever-growing body of literature demonstrates the effectiveness of aided AAC intervention with children with complex communication needs (Chavers et al., 2021; Ganz et al., 2011; Lorah et al., 2014; O'Neill et al., 2018). Yet, effective communication support requires more than providing children access to aided AAC— it requires the child's close communication partners, like their parents, to integrate the device into the child's daily life. Children need the important people in their lives to recognize, value, and support their communication, in all of its forms (Biggs & Meadan, 2018).

Importance of Parent-Child Interactions

Children's home environments—particularly their relationships and interactions with their parents—are crucial for their development (Biggs & Meadan, 2018). Through parent-child interactions, children build skills across domains, including communication, language, social-emotional, and cognition (Biggs & Meadan, 2018; Chavers et al., 2021; Fäldt et al., 2020; Jeon et al., 2013; Mendelsohn et al., 2018). The transactional model of development emphasizes the importance of responsive and bidirectional parent-child interactions to support a child's language

and communication development (Sameroff & Fiese, 2000). The back-and-forth turn-taking communication between children and their parents play important roles in children's language, communication, and literacy development (Warren & Brady, 2007).

Two features of parents' interactions with their children support their children's language learning, including (a) responsivity and (b) the quantity and quality of language input. Parent's topic responsivity is a multi-faceted construct that includes characteristics of the parents' stability, sensitivity, nurturance, and warmth as a direct response to their children's communication, behavior, and other cues (e.g., emotional cues) during their dyadic interactions (Bornstein & Tamis-LeMonda, 1989; Landry et al., 2001; Van Jeijl et al., 2006). Although definitions of parent responsivity vary, responsiveness generally comprises four aspects of parents' interaction styles: (a) contingent responding to their child, (b) emotional affective support, (c) joint attention with their child, and (d) providing language input that matches their child's level (Laudry et al., 2006, Spiker et al., 2002, Warren & Brady, 2007). Parent responsivity supports children's language learning when their interactions with their child are timely, positive, and contingent on the child's cues—in other words, when parents use language to build upon a child's attention and activity, following the focus of the child's lead (Spiker et al., 2002, Warren & Brady, 2007). Parent responsiveness has been associated with many positive outcomes for children's development, including increased language, cognitive skills, and social skills, and fewer behavioral and emotional problems (Landry et al., 2006; Van Zeijl et al., 2006).

The language input that parents provide during interactions also impacts their children's language and communication development (Rowe, 2012). Language input describes the quality and quantity of parental talk during their interactions with their child— specifically language directed to the child, and not another communication partner (Anderson et al., 2021). The

quantity of parental language input is generally measured as the number of words or utterances spoken to the child (Laks et al., 1990; Rowe, 2012). Yet, quantity of parental linguistic input is not all that matters—quality does as well – in terms of impacting their children's language and communication development. The *quality* of linguistic input can be defined in multiple ways, typically measured by interactive features (e.g., responsivity and joint-attention), linguistic features (e.g., vocabulary and lexical diversity), and conceptual features (i.e., the topics that parents talk about with their child; Anderson et al., 2021; Row & Snow, 2020). Putting together the ideas of responsivity and language input, it is clear that high-quality language input from parents is when parents respond directly to their child using language, modeling more complex words and phrases by building on and expanding their child's communicative attempts.

As important as parent-child interactions are for children's development, they do not come as easily when the child has complex communication needs, compared to when children are able to reliably use verbal speech to communicate (Biggs & Meadan, 2018; Kent-Walsh et al., 2010). Children with complex communication needs may have characteristics that can make turn taking between them and their parent more difficult, including: sensory hypersensitivities, slower response times, eye gaze avoidance, low rates of initiating communication, behavior challenges, briefer attention spans, difficulties with conversational discourse, and receptive and expressive language delays (McNaughton et al., 2008; Warren & Brady, 2007). Because social interactions are transactional, parents' behaviors are shaped by their children's behaviors. Relative to parents of children who are typically developing, parents of children with complex communication needs may be more likely to use less language, and their language may also be more directive of their child rather than responsive to their child (Barton-Hulsey et al., 2020).

Children's communication patterns shape the number and nature of opportunities for parents to be responsive to their child and to provide meaningful language input in response to their child's communication attempts (Laundry et al., 2012; Woynaroski et al., 2014).. As a result it is important to understand that children with complex communication needs vary in the frequency of their communication attempts when contributing in parent-child interactions (Laundry et al., 2012; Woynaroski et al., 2014).

Perspectives of Parents with Children with Complex Communication Needs about AAC

The parents of children who use Aided AAC have indicated that they find it challenging to support their children's AAC use (Johnson et al., 2006; Moorcroft et al., 2020). Parents who have had positive experiences with their children learning to use aided AAC underscore that they believe these devices have provided their children with greater communication access, increasing their children's autonomy and self-esteem (Wilder et al., 2015). Yet, many parents have indicated that it is difficult for them to learn how to use their child's new device in their day-to-day interactions (Batorowicz et al., 2014; Doka, 2019; Gona et al., 2014; Marshall & Goldbart, 2008; Moorcroft et al., 2020). Specifically, parents state this difficulty comes from the high demands of everyday life, including their job, raising multiple children, managing challenging behaviors, and household tasks, makes for little available time to implementing AAC use for many families (Moorcroft et al., 2021). Moorcroft and colleagues also found that many mothers reported abandoning AAC systems for other reasons, including feeling that their children's devices were slow, not user-friendly, physically not compatible, and difficult to navigate (2021).

Adding to these challenges, parents often lack support from professionals related to AAC—especially support that goes beyond knowing how to operate the device so that families

can learn how to integrate the device into everyday life (Baxter et al., 2012). Parents describe feeling devalued and disregarded by AAC intervention professionals (Moorcroft et al., 2020). They feel AAC interventionist perceive themselves, as the professional, or the only "expert," on their child and fail to listen to parents' concerns, thoughts, or ideas (Moorcroft et al., 2020). Some parents who have abandoned AAC explain that they would have likely accepted and continued using their child's AAC system if they were provided the appropriate supports and given more regard by AAC intervention professionals(Moorcroft et al., 2020).

Parent-Child Interactions During Shared Reading

Shared book reading is a critical context that parents use to support their children's learning, including children with and without complex communication needs (Gilkerson et al., 2017; Mucchetti, 2013). Shared book reading refers when parents and their children read together, particularly when parents use scaffolding to support children's engagement, communicative interaction, and early language and literacy development (Anderson et al., 2021; Hudson & Test, 201; Landry et al., 2012). Shared book reading is part of many families' daily routines, although factors such as socioeconomic status, marital status, maternal education level, and ethnicity have been found to be associated with the frequency of book reading (Laundry et al., 2012; Scarborough & Dobrich, 1994; Tipton et al., 2017). Parent-child shared reading is also highly associated with later literacy outcomes— providing a foundation for future reading, communication, and social skills (Fleury & Hugh, 2018; Light & McNaughton, 20112; Schickedanz & McGee, 2010; Whitehurst & Lonigan, 1998).

Because transdirectional parent-child communicative interactions themselves are what is so important for children's learning, shared reading is more than parents reading a book verbatim to their child. Instead, high-quality book reading requires scaffolding, where the parent uses

strategies to sustain social interactions and increase child engagement with and communication about the literature at hand (Fleury & Hugh, 2018). There are a variety of ways parents can scaffold these communications for more rich interactions—including questions, elaborations or comments, responses to children's communication, and print referencing (i.e., parents verbally calling attention to features of print and written language; Barton-Hulsey et al., 2020; Hudson & Test, 2011; Landry et al., 2012; Tipton et al., 2017). These strategies allow parents to turn shared reading into an important opportunity for the child to participate in (a) learning and using language; (b) learning and talking about the book and concepts (e.g., title, turning of a page, how to track print, what a word is, the meaning of print, alphabet concepts); and (c) thinking abstractly about books and stories, such as by making inferences, making predictions, and relating the story to their own real-world experiences (Barton-Hulsey et al., 2020; Biggs et al., 2022; Westerveld et al., 2020).

Although researchers have attended to the nature of parent-child interactions during shared book reading, they have generally focused more on *parents'* behaviors and interaction styles than *children's* communicative behaviors during book reading themselves. Only a few studies have given insight into how children with intellectual and developmental disabilities contribute to parent-child book reading interactions, but these have not necessarily focused on children with complex communication needs. For example, Barton-Hulsey and colleagues (2020) examined parent-child shared book reading for parents and their young children with Down syndrome, relative to parents of typically developing children. They found that children with Down syndrome used less spoken language and more gestures and non-word vocalizations than their same-age peers. Additionally, the mothers of children with Down syndrome scaffolded interactions by reading less verbatim and instead using more gestures than mothers of typically

developing children. Similarly, Fleury and Hugh (2018) examined differences in caregiver-child interactions during shared book reading for children with autism, compared to children who were typically developing. The found that children with autism were more likely to be passively engaged with the book (e.g., listening and looking at the book but not actively interacting) and more likely to be disruptive or unengaged behavior than their same-age peers without disabilities.

From a transactional perspective of language development, it is important to understand the nature of children's communication with their parents during shared book reading because their communication attempts will shape how parents can respond and further support their child's learning. Thus, it is important to understand how children with complex communication needs communicate with their parents during shared book reading. Such research could examine the nature of children's communication in terms of frequency of interactions, their form (e.g., prelinguistic, speech, aided AAC), function (e.g., comments, requests), and focus (e.g., labeling or describing pictures, communicating about print, communicating, and thinking more abstractly about a book).

Purpose of this Study

The purpose of this research was to examine the nature of children's contributions to parent-child interactions during shared book reading, particularly for elementary-aged children (K-4th grade) with complex communication needs who were learning how to use a speech generating device. The following research question: What is the nature of child communication during shared reading interactions with their parent? Focused in examining children's communication as a group, but it was also anticipated that children's communication would vary widely within the group because of their heterogeneity. Therefore, this research also is exploring

patterns of similarities and differences in children's communication based on how frequently they communicated (e.g., children who were low-, mid-, or high-rate communicators during book reading with their parents). Research was descriptive and exploratory, and so there is not a specific hypothesis. But, there is a particularly interest in understanding the following facets of children's communication with their parents: (a) the frequency and rate of their communication turns; (b) the form of their communication (e.g., use of gestures, non-word vocalizations, spoken words, and their speech generating device); (c) whether they primarily initiated topics or responded to their parent; (d) the function of their communication turns (e.g., commenting or answering questions, requesting or rejecting, asking questions); and (e) the focus of their communication (e.g., labeling or describing pictures in the book, communicating about print or the features of the book itself, communicating about more abstract concepts such as story structure).

CHAPTER II

METHODS

Participants and Recruitment

Participants were 18 elementary-aged children with complex communication needs, in Kindergarten (K) to 4th grade, and one of their parents. To be included in the study, a family had to live in the state of Tennessee, and their child had to (a) have an intellectual or developmental disability; (b) receive special education services in grades K-4 at a public school; (c) have complex communication needs; and (d) be learning to use a high-technology speech generating device and have access to it at home. For the purpose of the study, having complex communication needs was defined as using prelinguistic (gestures and vocalizations) or early linguistic communication (single words or phrases that were 2-3 words), and this was measured based on parent-report through the Communication Matrix (Rowland & Fried-Oken, 2010).

Participants were a sub-set of participants from a larger mixed method study. Recruitment for this larger study involved sharing study information with potential families through emails and flyers that were distributed across the state of Tennessee. Study information was sent through multiple means—specifically school districts, service providers, and disability-related and non-disability-related community associations (e.g., parent support groups, disability organizations, faith communities, community centers). Families that were interested were directed by the recruitment materials to the study's website for additional information and a

interest form. If the family completed the interest form, they were contacted by a research team member for an eligibility screening performed over the phone.

Participant information is reported in Table 1.

Table 1

Participant Characteristics

	n (%)	*M* (*SD*)
Child characteristics		
Age		7.6 years (*SD* = 1.4)
Female	10 (55.6%)	
Grade		
Kindergarten	5 (27.8%)	
1st-2nd	7 (38.9%)	
3rd-4th	6 (33.3%)	
Household/family characteristics		
Second caregiver in the household	14 (77.8%)	
Other children/siblings	18 (100.0%)	
Family income		
< $30,000	3 (16.7%)	
$30,000-69,999	4 (22.2%)	
$70,000-110,000	4 (22.2%)	
> $110,000	6 (33.3%)	
Prefer not to report	1 (5.6%)	
Parent respondent characteristics		
Age		39.4 years (*SD* = 7.6)
Racial/ethnic background		
White, non-Hispanic or Latino	17 (94.4%)	
Multiple races/ethnicities	1 (5.6%)	
Highest education level		
High school diploma or GED	1 (5.6%)	
Some college	5 (27.8%)	
Trade/technical/vocational training	1 (5.6%)	
Bachelor's degree	7 (38.9%)	
Graduate degree	4 (22.2%)	
Employment and student status		
Employed full or part time	6 (33.3%)	
Unemployed or work-from-home	6 (33.3%)	
Student, not working	1 (5.6%)	
Student and employed	5 (27.8%)	

SIS-C = Supports Intensity Scale, Children's Version

[a] One child had a dual diagnosis of cerebral palsy and autism.

[b] Data were missing for two participants.

Of the 18 children, just over half were female (55.6%), and most were White and non-Hispanic (94.4%). One child was biracial. Children had different primary disabilities: autism (50%; *n* = 8), Down syndrome (33.3%; *n* = 6), and specific genetic conditions associated with intellectual disabilities (11.1%; *n* = 2), combined autism and Down syndrome (5.6%; *n* = 1), and combined autism and cerebral palsy (5.6%; *n* = 1). Most children had multiple diagnoses, including developmental delay (50%, *n* = 9), intellectual disability (44.4%, *n* = 8), chronic health condition(s) (38.9%, *n* = 7), attention-deficit/hyperactive disorder (ADHD) (11.1%, *n* = 2), anxiety (5.6%, *n* = 1), and visual impairment (5.6%, *n* = 1). The intensity of children's support needs was evaluated using a standardized measure called the Supports Intensity Scale-Children's Version (SIS-C; Thompson et al., 2014). Across children, the average standardized percentile score was 44.0 (*SD* = 28.1), which means that the children in this study, on average, had greater support needs than 44.0% of other same-aged children with an intellectual or developmental disability. Standardized percentile scores ranged widely in the sample though, from 1.0% to 92.9%. Further, based on the SIS-C ratings, one-half of children had intensive behavioral support needs (50%) and one-third had intensive medical support needs (33.3%).

Parent reported communication skills for their children ranged from mostly pre-linguistic communication (e.g., gestures and non-word vocalizations) to linguistic communication, which ranged from a few single words to longer phrases or short sentences used (speech or aided AAC). All of the children had access to a speech generating device that they were learning to use, with 88.9% of parents reporting that their child used the device at least *rarely* when they were home. Almost three-quarters (72.2%) of participants used an iPad as a non-dedicated speech generating device; the remaining participants had a dedicated speech generating device (27.8%).

Most participating parents were children's biological mother (83.3%, *n* = 15); two were their biological fathers (11.1%), and one was an adoptive mother (5.6%). Most were married or had two parent homes (77.8%, *n* =14). Approximately two-thirds of (61.1%, *n* = 11) parents had a bachelor's degree or higher as their highest level of education. Six parents were employed full or part time (33.3%), six were either unemployed, stayed at home, or worked from home (33.3%), one was a student who was not employed (5.6%), and five were students and also employed (27.8%). Just over half of families lived in a suburban setting (55.6%, *n* = 10); 33.3% lived in rural settings (*n* = 6) and 11.1% in urban settings (*n* = 2).

Procedures

Data was collected through remote video observations of parents and their children reading together in their home. Observations were conducted as part of a larger, longitudinal mixed methods study focused on the experiences of parents with children with complex communication needs, related to supporting their child's language and literacy learning during the COVID-19 pandemic. However, observations were conducted at just one time point within this broader project (January 2021), and so the current study is cross-sectional not longitudinal.

Observational Data Collection

Observations were structured by having each parent-child dyad participate in a shared book reading episode where they read two different books. One book was selected by the parent from their home, and they were directed to choose either their child's favorite book or their child's most familiar book (if their child did not have a favorite book). The other book was one of two books that were selected by the research team. Specifically, prior to the observations,

participants were mailed two books, both authored by Mo Willems: *The Pigeon Finds a Hot Dog!* and *There is a Bird on Your Head!* These books were selected because they are both similarly short, age-appropriate, and engaging books (with silly characters and engaging illustrations). In addition, they are books that are well-designed for emergent literacy learners because they have high print-salience (i.e., large text, colored text, text in speech bubbles) and many easy to read words (i.e., simple decodable words, high-frequency sight words). Parents could select either book that was mailed to read during the observation, based on what they thought would be best for their child. They could also read the books in any order (i.e., the preferred book and then one of the mailed books, or the other way around). Out of the 18 families, 11 choose to read *The Pigeon Finds a Hot Dog!* (61.1%) and 7 choose to read *There is a Bird on Your Head!* (38.9%).

Observations were conducted and video recorded by a research team member through web-based video recording (Zoom). Each research team member had been able to build rapport with the family before the observation because they conducted interviews with the parent as part of the larger mixed method study. The parent selected the day and time for the observation, based on a time that worked well for them and their child, such as if they had a regular time of day that they read together. The parent also selected the location in their home to read, which most often was the parent's or child's bedroom, the family living room, or the kitchen; one family read with their child in their backyard while the child was on a swing set because the mother said it was a strategy, they used to help their child engage with books. After the parent and researcher logged into Zoom, the researcher (a) greeted the parent and child; (b) reminded the parent that they would be video recording; (c) confirmed that they had books ready and the speech generating device within arm's reach; and (d) helped the parent position the recording

device (e.g., laptop, phone) in a way that the parent and child could be seen and heard clearly. The researcher then explained to parents that the purpose was to see how they and their child normally read together, and that they should not feel pressure to do anything special or different. Related to the speech generating device, the researcher ensured each parent had the device available, but they instructed the parent to simply use the device however they normally would. The researcher then muted themselves and hid their video so that it was not a distraction, telling the parent they could begin reading whenever they were ready. Parents read both books with their child in sequence, and then the researcher came back on camera to end the session. Thus, the observations were structured by having all parents read two books with their children, but the duration ranged based on the nature of the interactions. The average length of the video observation (i.e., for both books combined) was 9 min, 16 s (range, 06:03 to 15:42; *SD* = 02:48).

Transcription

Video recordings were trimmed to include only the length of the actual shared book reading interactions, and then each video was transcribed by one of nine student research assistants. The research assistants were undergraduate and graduate (master's) students who had been trained in using Systematic Analysis of Language Transcripts (SALT) software for transcription of parent-child interactions. SALT is a software used to standardize the process of transcribing, analyzing, and understanding child's communication and linguistic features, as well as adult language input and other strategies used to support child language learning (Miller et al., 2019).

In accordance with SALT conventions, all child and parent utterances were transcribed into communication units (C-units). Using C-units ensures standardization of the transcription

process by breaking down verbatim utterances into either (a) a main clause or (b) a main clause with its subordinating clause (Miller et al., 2019). In addition to children's linguistic communication (i.e., children's speech or aided AAC use), children's prelinguistic communication acts were also transcribed, so long as they were accompanied with evidence of communicative intent (e.g., orientation to the parent, signs of persisting with the message, gaining parents' attention). Unintelligible child utterances that were intentional communication acts were transcribed as either x (single non-word vocalization or unintelligible word) or xxx (multiple non-word vocalizations or unintelligible words strung together); this included both non-word vocalizations that were intentional communication and unintelligible words. Children's communicative gestures were transcribed using descriptions of the gesture in brackets. Verbatim read lines of the book's text (whether by the parent or child) were also transcribed through the SALT software, but they were marked with a code as being read to distinguish them from extratextual talk (see Coding below). Children's speech sounds or body movements that were not accompanied with signs of being intentional communication to the parent were *not* transcribed. To ensure the accuracy of transcripts, each transcript was (a) transcribed by one trained research assistant, and then (b) independently verified and corrected as needed by a second trained research assistant. The team met weekly for SALT transcription meetings which allowed for group discussion and ensured the team resolved all questions or disagreements (Baker et al., 2015).

Coding of Child Verbal and Nonverbal Utterances

Although parent and child utterances were transcribed, this study only involved analysis of child utterances because of the interest in children's contributions to the book reading

interactions. The research team developed a coding framework to analyze child utterances, adapting the work of previous researchers (Barton-Hulsey et al., 2020). Research team members coded the transcripts while watching the video recordings, which supported the accuracy of coding. There were four categories of codes, capturing the four facets of children's communication that were of interest: (a) form, (b) topic responsivity, (c) function, and (d) focus. In general, coders applied one code from each category to each child utterance line on the transcript. The two exceptions to this were: (a) when child utterances were lines read from the book (in which case the utterance line was marked only with one of the "READ" codes), or (b) when child utterances were only non-word vocalizations or unintelligible speech (in which case the utterance line was marked only with the "VOC" code). Codes within each of the four categories are described below and presented in Table 2.

Table 2

Definitions and Examples of Each Code Across the Four Categories

Code Category and Code	Description	Example
Form		
Non-word vocalization	Non-word or unintelligible vocalizations with communicative intent	Child says, "la" when looking at book illustration
Gesture	Physical gesture or sign with communication intent	Child reaches to an object and looks up to their parent
Non-word vocalization and gesture combination	Use of a gesture and non-word vocalization together for communication	Child shows a desired book to their parent and vocalizes
Speech	Words or word approximations spoken without aided AAC	Child points to the book and says "there is a man"
AAC	Aided AAC with no spoken words	Child presses the symbol for apple, and it generates speech for chosen word
Speech and AAC combination	Spoken words and word approximations paired with aided AAC	Child says, " the dog" and presses the symbol for dog on the SGD
Topic responsivity		
Topic continuing	Utterance continues the same or a closely related topic of their partners prior utterance. Or following a read utterance the child's utterance actively contributed to the topic that was read.	Mother says, "look at the smiling pig." The child says "happy" and points to the illustration.
Topic initiating	The child's utterance introduces a new topic, that is not to focus of either partner's most recent utterance.	The parent is talking about the book illustrations and the child says, "I am hungry."
Function		
Question or directive for language	Question or directive for communication partner to respond with language	"What is that?"
Request or directive for behavior	Requests or directives for communication partner to respond with a behavior	"Look here." when the partner is looking in another direction
Comment	Comments, descriptions, responses to questions or other statements that do not request anything	"This book is about hot dogs."
Read	Verbatim reading of text	Child reads verbatim "the cat's name is Sam" from the book without full prompting by adult
Read-P	Child's verbatim reading of text fully prompted by adult	Parent says, "read the hat was big." Pointing to the text then the child read verbatim "the hat was big."
Focus		
Label	Language explicitly labels or names an immediate referent in the environment.	The child says "pig!" when looking at a picture of a pig
Description	Language explicitly describes an object or action in the environment, beyond labeling it	The child says, "pink pig," "fast car," or "happy baby" to describe a specific referent
Book and print concepts	Utterances that identify standard conventions of a book or concepts of print through linguistic or non-linguistic means	The child says "turn the page."

Letter name	Utterance that identifies or ask about a letter or letters' name.	Child says "K!" and points to the letter K
Decoding and encoding	Identifying, manipulating, or segmenting/blending sounds of a word and referencing the graphemes in the book.	When trying to decode the word "chat" the child says /tʃ/, but does not read the word successfully
Cognitive abstract thinking	The child thinking critically about the book by making comments or directives that compare/contrast, evaluate, infer, predict, make judgements, or addresses story elements	Parent infers the child's knowledge by asking "what did he find?" and the child responds, "a bunny!" and the next page is a bunny.
Cognitive connection	Child's communication links the book to their own real-world experience	The child says "my house" when pointing to the book's illustration of a home
Other	Utterances that do not fall under language-focused, print-focused, cognitive-focused codes	Directives for behavior or engagement (e.g., "come here") Simple agreement utterances (e.g., "yeah") Other short utterances (e.g., yes/no) Utterances with a subject that is not an environmental referent

Form. Each child utterance line that was non-read was coded as being one of the following forms of communication: (a) non-word vocalization (including non-word speech sounds and unintelligible speech); (b) gesture or body movement (including manual signs, where were almost never used by children in the sample); (c) a combination of both a gesture and a vocalization; (d) speech (i.e., an intelligible spoken word); (e) the speech generating device (i.e., aided AAC); or (f) a combination of both speech and the speech generating device. Later in analysis, utterances comprised of gestures or body movements, or non-word vocalizations were combined into a category of *prelinguistic communication.*

Topic Responsivity. Topic responsivity was coded for all child utterances that were (a) non-read, and (b) not solely comprised of a non-word vocalization. There were two topic responsivity codes: *topic continuing* and *topic initiating*. A "topic" was defined as the focus of the communicative interaction, such as the referent object, action, or event that was being discussed by the parent or child. Therefore, topic *continuing* utterances were when children

responded contingently to their parent, continuing the same topic. Topic continuing utterances could follow parent comments, parent questions, or parent lines read verbatim (i.e., if the child communicated about the same topic their parent just read). Topic *initiating* utterances were anytime children introduced a new topic that the parent had not yet talked about in that exchange. For example, if a child initiated a topic and the parent did not respond to that topic, all the child utterances about that topic would be topic initiating, unless or until the parent responded contingently to the topic (Yoder et al., 1994).

Function. The function of the child's utterance was its communicative purpose, and all child utterances that were not solely comprised of a non-word vocalization were coded for function, including read lines. If a child utterance was read it was given a "READ" code unless the parent fully prompted the child (i.e., told them what to say to read the line), and then it was coded as "READ-P." All non-read child utterances (that were not comprised solely of a non-word vocalization) were coded as one of the following functions: (a) question, (b) request (which included any request or protest), or (c) comment or other response, such as a response to a parent question.

Focus. Like with topic responsivity, all child utterances that were (a) non-read and (b) not solely comprised of a non-word vocalization were coded for focus. We used focus codes to capture areas of specific interest, specifically (a) if the child labeled or described pictures in the book or other referent objects (which we called *language-focused* utterances to capture our interest in how children used content language about specific referents), (b) if the child communicated about print (e.g., letter names, letter sounds) or book conventions (e.g., pointing to print, talking about the title, author, or parts of a book) which we called *print-focused* utterances to capture our interest in how children communicated about print, or (c) if the child

communicated using more decontextualized language, including abstract thinking (e.g., predicting, addressing story elements) or making connections between the book and their own life (which we together called *cognitive-focused* utterances). Utterances were coded as "OTHER" for focus if they were not language-focused, print-focused, or cognitive-focused.

Coders, Their Training, and Inter-Observer Agreement (IOA)

Primary coders were three coders consisting of the author and two other research assistants—one undergraduate research assistant and one graduate (master's) research assistant. Each coder was trained by the lead faculty advisor in the rules and procedures to code SALT transcripts for analysis. Training consisted of approximately 6-hours of direct instruction from the faculty advisor (including using a coding manual, clear explanations of codes, examples and non-examples, modeling of coding procedures, and guided practice), independent coding practice with specific feedback from the faculty advisor, and the completion of "test" videos. Each coder had to complete two separate test videos (each about 10 min in length) and achieve a satisfactory level of reliability on each code category (i.e., Kappa of .6 or greater) before beginning to code study data.

To address reliability of coding, six transcripts (33.3%) were randomly selected to be coded by a second coder. This was done by a Cohen's Kappa analysis (Cohen 1960), which is appropriate given the categorical nature of the coding framework. Kappa analyses were run separately on each of the four code categories: form, function, focus, and topic responsivity, then they were averaged across those for categories to determine a total estimate of reliability. Average kappa was 0.90, which involved the following averages for each code category: 0.98 for

form (range, 0.90 to 1.00), 0.92 for function (range, 0.86 to 1.00), 0.86 for topic responsivity (range, 0.67 to 0.95), and 0.85 for focus (range, 0.77 to 0.94).

Data Analysis

Preliminary Data Analysis—Preparing the Data Set

Preliminary data analysis consisted of two main processes—extracting data from SALT for each child related to the linguistic features of their communication (e.g., number of different words) and transferring the SALT codes to SPSS for further analysis. First, I used SALT to produce the following variables for each child, based on the parent-child shared reading episode (both books): (a) total number of child utterances, (b) the mean length of utterances in words (MLU), and (c) the number of different words (NDW). Second, I conducted initial analysis of the codes for children's communicative utterances (i.e., form, topic responsivity, function, focus). To do this, data for each individual participant from SALT was transferred to SPSS (version 29) by creating separate data files for each individual participant. In these individual data files, each row of the data set represented one utterance from the child. The columns of the data were comprised of the four code categories, with categorical options for the individual codes in each cell. This allowed me to use SPSS to calculate the *frequency* and *proportion* of different types of child utterances for each child in the sample based on the four code categories.

Primary Data Analysis

Based on the research question and goals, the focused analyses on describing children's communication (a) as a full sample and (b) for smaller subgroups was based on the frequency of their communication with their parent during shared reading. Descriptive statistics and data

visualization were used to accomplish both goals. First, for the full sample, I created a set of Box and Whisker Plots (also called a Box Plot). Box and Whisker plots depict the distribution of the data by showing (a) the median value, as a horizontal line, (b) the second and third quartile, as a larger black box, and (c) the minimum and maximum values, as extended lines. To visualize the data, I used a series of Box and Whisker Plots to show the different features of children's communication as a whole group, including the number of read and non-read lines, and then the form, topic responsivity, function, and focus of each of children's non-read utterances.

Second, participating children were separated into three groups based on the frequency of their communication with their parent during shared reading. Frequency was used, rather than rate, because observations were structured based on each parent-child dyad reading two books, rather than restricting the observations to a certain amount of time. Thus, to create groups, the frequency of children's utterances were examined with their parents across the two books. The groups were created by separating participants into quartiles based on their communication frequencies. The low-frequency group were participants in the first quartile, the mid-frequency group included participants that fell within the second and third quartiles (i.e., the middle 50%), and the high-frequency group were participants in the fourth quartile.

CHAPTER III

RESULTS

What is the Nature of Children's Communication Across the Full Sample?

Figure 1 displays the Box and Whiskers Plots showing the nature of children's communication for the entire sample of children.

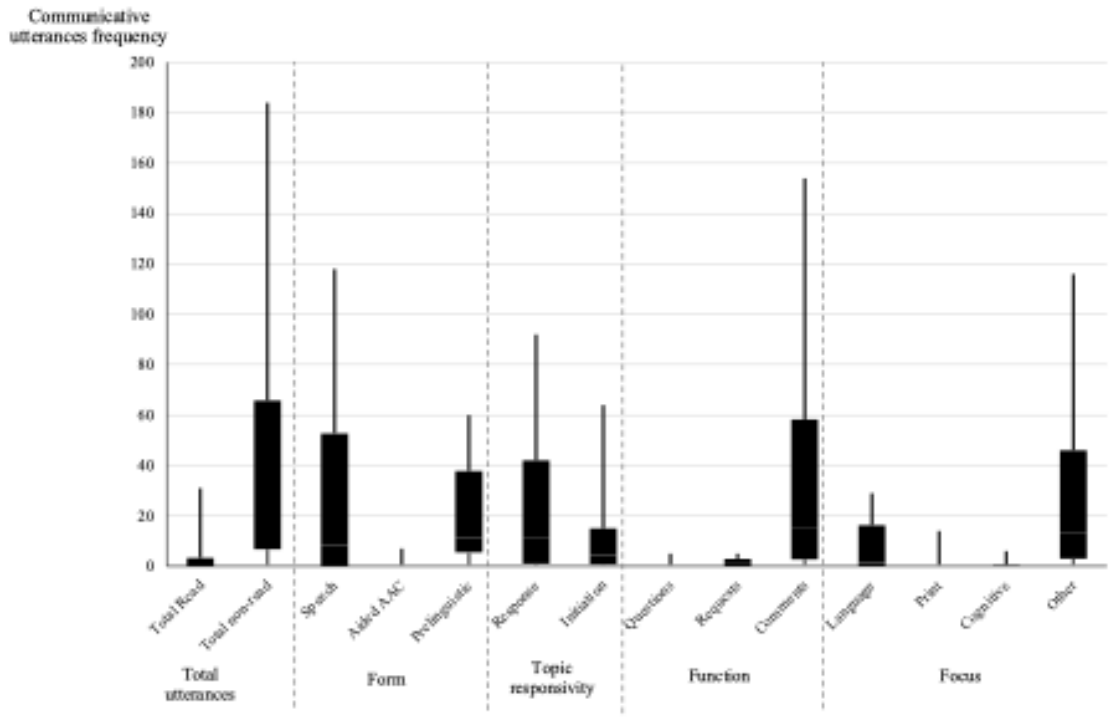

Figure 1. Box and whisker plot of the frequency of children's utterances, including total utterances, form, topic responsivity, function and focus.

The figure shows the frequency of children's total utterances as a group (read and non-read utterances), along with the different features of interest of these utterances— their form, topic responsivity, function, and focus. Most child utterances were non-read (90.2%). Of 869 total child utterances across the full sample, 799 were non-read and 66 were read utterances (including read utterances that were prompted, meaning the children's parents told them the word to read). Only six participants had any read utterances (including those prompted), ranging from 3-31 instances across the two books they read with their parents. Just over half of the read utterances (53.5%) were prompted by the parent (i.e., the parent fully modeled/told them what to say), and children never used their aided AAC to read words from the books. Child participants used 328 new and different words (NDW), throughout all book reading sessions, ranging from 0-66 different words per participant (M = 18.2; SD = 23.0). The mean length of communicative utterances (MLU) was 0.9 words per utterance (SD = 0.66).

Frequency, Rate, and Form of Children's Communication

The frequency of children's communication during parent-child book reading varied widely across the sample. The median number of utterances across the two books (not including read utterances) was 34.5, which ranged from 0-184 (M = 44.4, SD = 47.9). The rate of child's utterances varied in similar patterns as frequency. On average, children had 4.3 utterances per min, ranging from 0 to 12 (SD = 3.9; Mdn = 3.5).

Form of Communication

Children almost never used their speech generating devices. Specifically, only one child used their aided AAC device during the observation and their device was only used in seven of this child's total utterances (i.e., 3.8% of that child's utterances). Thus, when looking at the whole group of children, aided AAC use only comprised 0.9% of their communication. Instead of aided AAC, children more regularly used verbal speech (53.8% of all of children's non-read utterances) and prelinguistic communication such as gestures/body movements or non-word vocalizations (45.3% of non-read utterances). The median number of speech utterances for each child was 8.5 (M = 23.7, range 0-118), and the median number of prelinguistic utterances for each child was 11.5 (M = 20.0, range 0-60).

Topic Responsivity

Children continued topics with their communication more than they initiated topics; more than two-thirds of coded utterances were topic-continuing (70.2%), and just under one-third were topic-initiating (29.8%). The median number of topic-continuing utterances for each child was

11 (*M* = 24.56, range 0-92), and the median number of topic-initiating utterances was 4.5 (*M* = 10.44, range 0-64).

Communicative Function

Almost all of children's non-read utterances were comments or other responses, and children rarely asked questions, requested, or protested. More specifically, 94.4% of non-read child utterances coded for function were comments, with a median number of 15.5 per child across the two books (*M* = 33.5, range 0-154). Requests made up 4.4% of children's non-read utterances, with a median of only 1 per child (*M* = 1.56, range 0-5). Questions made up 1.3% of non-read utterances, with a median of 0 per child (*M* = 0.44, range 0-5).

Focus of Communication Acts

Most of children's utterances were coded as "OTHER" for focus (74.5%), rather than being language-focused (i.e., labels or descriptions), print-focused, or cognitive-focused. Within the three areas of focus, children's utterances were much more likely to be language-focused (i.e., labels or descriptions of referents such as the pictures of the book), and they were much less likely to be print-focused or cognitive-focused. Language-focused utterances made up 20.5% of children's utterances, with a median of 1.5 language-focused utterances per child (*M* = 7.28, range 0-29). Print-focused utterances made up only 2.8% of children's utterances, with a median of 0 per child (*M* = 1, range 0-14). Cognitive-focused utterances made up 2.2%, with a median of 0 per child (*M* = 0.78, range 0-6).

How do Communication Profiles Vary Across Groups Based on Communication Frequency for the Child?

Figure 2 displays information about the nature of children's communication across the three groups—low-frequency communicators, mid-frequency communicators, and high-frequency communicators.

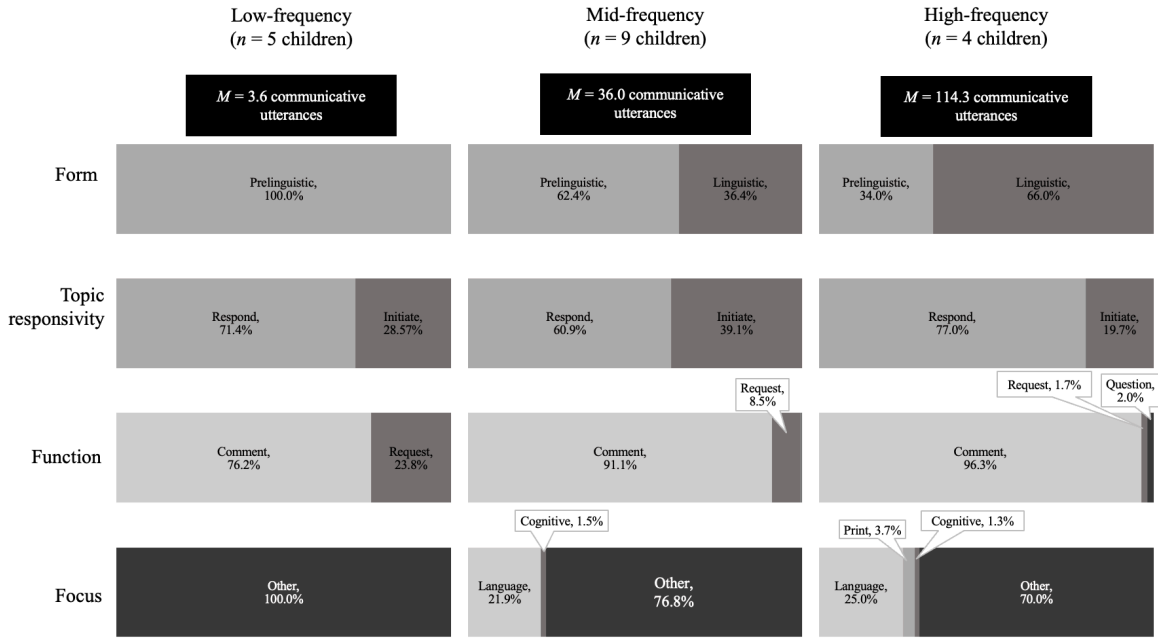

Figure 2. The nature of child communicative utterances across the three frequency groups.

In the sections below, I provide information about the characteristics of the children in each group (e.g., primary disability, AAC type, age, gender, supports intensity from the SIS-C), and then report findings about the nature of their communication. Table 3 also summarizes information about children's characteristics across the three groups.

Low-Frequency Communicators

There were five children in this group (27.8% of the sample), and the frequency of their communication ranged from 0-7 utterances across the two books (M = 3.6; SD = 3.1). Of note, one child never communicated intentionally with their parent (in any mode) during the book

reading episode, and a second child in this group had only one non-word vocalization that was intentional communication. Related to the characteristics of the children in this group, all but one child used a nondedicated iPad as a communication device (80%). Four of the five children had autism (including one child with autism and cerebral palsy) (80.0%), and one child had Down syndrome (20.0%). They ranged in age from 6 years; 4 months to 9 years; 9 months (M = 7;5), and four were male (80%). Two children were in the second grade (40%), and one child was in first (20%), third (20%), and fourth grades (20%). On average, children in this group had a standardized SIS-C percentile score of 63.2% (SD = 16.9), indicating they had more intensive support needs than 63.2% of other same-age children with intellectual and developmental disabilities.

See Figure 2 for a visualization of the nature of the communication from children in this group, relative to the other two groups. Related to form, all four children from this group who applied intentional communication used only prelinguistic communication (100%), including gestures and non-word vocalizations. Children responded to topics more than they initiated topics, with topic-continuing turns making up an average of 71.4% of their utterances (range, 14.0% to 100.0%). Most of their utterances were comments/other responses (M = 76.2% of their utterances; range, 29.0% to 100%). The focus of every utterance from this group of children was entirely "other" (M = 100%), which means no language-focused, print-focused, or cognitive-focused utterances were observed. The mean length of each communicative utterances (MLU) used by this group was 0.2 words per utterance (SD = 0.4; range, 0 to 1). There was only one word communicated in this group, so the new and different words (NDW) communicated was one (M = 0.2; SD = 0.4).

Mid-Frequency Communicators

There were nine children in this group (50.0% of the sample), and they ranged from having 10-62 communicative utterances across the two books (M = 36.0; SD = 21.5). Regarding their disability diagnoses, five had autism (55.6%), two had Down syndrome (22.2%), one had a specific genetic disorder, called SCN8A (11.1%), and one had both autism and Down syndrome (11.1%). They ranged in age from 6 years; 0 months to 9 years; 4 months (M = 8;0), and just over half were female (55.6%). Four children were in the third grade (44.4%), and two children were in both kindergarten (22.2%) and first grade (22.2%); one child was in second grade (11.1%). On average, children in this group had a standardized SIS-C percentile score of 44.2 (SD = 28.3) (see Table 3).

Table 3

Participant Characteristics in the Groups of Children Based on Communication Frequency.

	Low-frequency communicators n = 5	Mid-frequency communicators n = 9	High-frequency communicators n = 4
Disability			
Autism	60.0%	55.6%	0.0%
Down syndrome	20.0%	22.2%	75.0%
Autism and Down syndrome	0.0%	11.1%	0.0%
Autism and cerebral palsy	20.0%	0.0%	0.0%
Genetic condition	0.0%	11.1%	25.0%
AAC device			
Dedicated device	20.0%	44.4%	0.0%
iPad	80.0%	55.6%	100.0%
Age	M = 7.5 years (SD = 1.1)	M = 8.0 years (SD =1.3)	M = 6.8 years (SD =1.9)
Gender			
Female	20.0%	44.4%	0.0%
Male	80.0%	55.6%	100.0%
Supports intensity (SIS-C)	M =63.2 (SD =16.9)	M = 44.2 (SD = 28.3)	M = 24.4 (SD = 27.7)

Note. AAC = Augmentative alternative communication; SIS-C = Supports Intensity Scale – Children's Version

Figure 2 displays information about the nature of the communication of children in this group, relative to the other two groups. Related to form, children communicated primarily with prelinguistic communication such as gestures or non-word vocalizations, comprising on average 62.4% of their utterances (range, 11.0% to 100.0%). They responded to topics more than they initiated topics, with topic-continuing turns making up on average 60.1% of their utterances (range, 0.0% to 92.0%). Nearly all of their communication were comments/other responses (*M* = 91.1% of their utterances, range 64.0% to 100%); 8.5% were requests and 0.4% were questions. Most of their utterances were coded as "other" for focus (76.8%, range 38.0%-100.0%). An average of 21.9% of their utterances were language-focused (i.e., labels and descriptions), with a range of 0.0%-63.0%; 1.5% of utterances were cognitive-focused (range, 0.0% – 12.0%), and no utterances were print-focused. This group's mean length of communicative utterances (MLU) was 1.1 words per utterance, ranging from 0 to 2.0 words (*SD* = 0.6), and they used a total of 156 new and different words (NDW), ranging from 0 to 66 words per participant (*M*= 17.3; *SD* = 23.2).

High-Frequency Communicators

There were four children in this group (22.2% of the sample), and the frequency of their communication ranged from 77-84 utterances across the two books (*M* = 114.3; *SD* = 47.5). Three of the four children had Down syndrome (75.0%) and one had a specific genetic disorder called 16p11.2 Deletion Syndrome (25.0%). They ranged in age from 5 years; 4 months to 9 years; 5 months (*M* = 6;10), and all were female (100%). Two children were in the kindergarten (50.0%), and one child was in first (25.0%) and third grade (25.0%). On average they had more intensive support needs than about 24.4% of other same-age children with intellectual and

developmental disabilities, based on their SIS-C percentile score (M = 24.4; *SD* = 27.7) (see Table 3).

Related to form, children in this group communicated primarily using linguistic communication (66.0% of their utterances; range, 53.0% to 79.0%)—most often speech as only one child used their speech generating device, and only very rarely (see Figure 2). They responded to topics more than they initiated topics (*M* = 77.0% topic-continuing, range 59.0%-97.0%). Nearly all their utterances were comments/other responses (*M* = 96.3%, range, 89.0 – 100%); 2.0% of their utterances were questions (range 0.0 – 7.0%), and 1.7% were behavior requests (range 0.0 – 4.0%). On average, more than two-thirds of children's utterances were "other" in focus (*M* = 70.0%, range, 61.0 – 79.0%); an average of 25.0% of children's utterances were labels and descriptions (i.e., language-focused) (range, 12.0 – 38.0%), 3.7% focused on print (range, 0.0 – 9.0%), and the remaining 1.3% were cognitive-focused (range, 0.0 – 4.0%). The mean length of each communicative utterances (MLU) used by this group was 1.36 words per utterance (*SD* = 0.4; range, 1.15 to 1.9), this group used a total of 171 new and different word (NDW; *M*= 42.8; *SD* = 14.8; range, 31 to 64).

CHAPTER IV

DISCUSSION

This study investigated the nature of child communication for children with complex communication needs during shared book reading interactions with their parent, particularly for children who were reported to be learning to use a speech generating device. There is limited available research on what daily interactions look like between parents and their children learning to use aided AAC. The findings of this research expand existing knowledge and provide implications for research and practice by showing the variation in how and how often child communicate with their parents during book reading.

First, there was wide variability in the frequency of children's communication with their parents during book reading, and based on frequency patterns we were able to group children into three groups. It can be tempting to treat children with complex communication needs as one group, given the reality that they are a low-incidence group of children. But, the findings from this study show heterogeneity in several key ways about how children communicated with their parents— particularly related to frequency, but then also how frequency related to other aspects of their communication. It is important to keep in mind just how widely children's frequency varied. This is especially important to consider because the varying frequency of children's communication creates varying amounts of opportunities for parents to be responsive to their child with additional language input (Landry et al., 2012). Looking back at the findings from this study, it becomes clearer just how many more opportunities some parents have to respond to

their children's communication. Across just two books in the observed episodes, children in the low-frequency group had an average of 3.6 communicative utterances, children in the mid-frequency group had an average of 36.0, and children in the high-frequency group had an average of 114.3—more than 30 times the opportunities for parents to respond as children in the low-frequency group. This is important because, according to the transactional model of development, parents' language input for their children will be shaped by their children's contributions to the interaction, which in turn shapes children's language and communication development (Sameroff & Fiese, 2000).

There are a few things that make this study unique in the contribution it offers to the broader literature about parent-child book reading. First, most prior studies have largely focused on children who reliably use verbal speech for communication (Baker & Vernon-Feagans, 2015; Barton-Hulsey et al., 2020; Landry et al., 2012), but we focused on children with complex communication needs who were learning to use speech generating devices. Additionally, most other studies have focused specifically on children with a specific diagnosis such as autism or Down syndrome (Barton-Hulsey et al., 2020; Tipton et al., 2017; Westerveld et al., 2020), whereas we included children who had many different types of intellectual and developmental disabilities. This allowed us to gain some initial insight into how disability type might shape aspects of children's contributions to parent-child interactions during book reading. Of note, children with autism were more likely to be in the low- or mid-frequency groups (no children with autism were in the high-frequency group), and children with Down syndrome were more likely to be in the high-frequency group. Future researchers might consider looking further at patterns of behavioral phenotypes which are tied to specific disability labels. Doing this could allow more tailored AAC interventions which could address individual strengths and interests of

children, but also leverage understanding of children's behavioral phenotype to improve communication outcomes.

Second, the findings of this study revealed children's communication across all three groups was characterized primarily by being comments or other responses that were "other" in focus. This means that children did not communicate very often for the reasons that we were especially interested in: (a) using language to label or describe things in the book (language-focused), (b) referencing print or communicating about book and print concepts (print-focused), or (c) communicating more about the meaning of the study, by making connections or thinking abstractly (cognitive-focused). Shared book reading provides a context for increased use of a more diverse vocabulary, and the focus of children's contributions to book reading with their parents is likely tied to the focus of their parent's utterances (Barton-Hulsey et al., 2020; Landry et al., 2012; Tipton et al., 2017). For example, other researchers have found that parents themselves rarely reference or call attention to print as they read, including parents of children with and without disabilities (Justice et al., 2002; Westerveld et al., 2020). In this study, only children in the high-frequency communicator group ever communicated about print, and only rarely—with only 2.8% of utterances being focused on print. Cognitive-focused utterances were also extremely limited (only 2.2% of children's utterances), but even language-focused utterances were somewhat rare (i.e., 20.5% of children's utterances). Thus, even though shared book reading provides opportunity for increased use of vocabulary and opportunities to think and talk abstractly about stories (Scarborough & Dobrich, 1994), children with complex communication needs only infrequently communicate in these ways during book reading with their parents.

Finally, all of the children in this sample had access to aided AAC at home, but we learned they were not using these speech generating devices to communicate with their parents during book reading. Specifically, of the 18 participating children, only one used their aided AAC device at all, and when they did, it was constricted to only a few instances. This finding—about the lack of AAC integration into parent-child shared reading—is crucially important to consider, but it may actually not be all that surprising because it seems to build on existing literature where parents have expressed the challenges, they have knowing how to support their child's AAC use at home (Baxter et al., 2012; Moorcroft et al., 2020). Yet, this finding is concerning. Most AAC devices are underutilized or abandoned, with one study finding that speech-language pathologists reported fewer than 40% of AAC systems were used successfully for more than one year (Johnson et al., 2006). Parents have reported they abandon their child's aided AAC device for several reasons—most often because they find that integrating AAC into their daily routines is difficult, and because they feel alone and lack support from professionals (Moorcroft & Meyer, 2021; Moorcroft et al., 2020). More parental support could impact and increase a child's use of their AAC system during parent-child shared reading and decrease device abandonment. The lack of AAC integration among our participants is evident, learning that only 0.88% of all communicative utterances by children involved using their AAC device, and one child produced all of the 7 utterances involving the AAC device.

Limitations and Directions for Future Research

There are limitations that should be mentioned. First, though our sample size is consistent to prior research using similar observational methods (Barton-Hulsey et al., 2020; Berenguer et al., 2022; Burgess et al., 2013), the sample size is still modest (n = 18), and so it is difficult to know how representative the findings would be for the larger population of students with

complex communication needs. Future research with a larger sample could allow other types of quantitative analysis, such as to explore child or family-related characteristics that predict aspects of children's communication such as frequency. In this study, we took only a descriptive approach. Second, we chose to combine children's use of manual signs with other gestures and body movements (e.g., pointing, reaching) because children in our sample rarely used signs to communicate. However, many other children with complex communication needs do use manual signs (Mirenda, 2003). Thus, future researchers may want to separate those forms of communication into different categories, or explicitly recruit children who use signs as a primary means of communication. Doing this could provide important information that could support intervention development related to multi-modal linguistic communication (i.e., speech, sign, aided AAC).

We focused on children's contributions to parent-child interactions, but future work should investigate the role of parent's interaction styles and language input during shared book reading, particularly for children with complex communication needs learning to use aided AAC. For example, researchers could focus on understanding what aspects of parent interaction contribute to children communicating more frequently. Or researchers, might seek to understand what parent interactions styles support children in participating actively in the types of communication exchanges that could especially support their learning (e.g., labeling or describing pictures, talking about the print, thinking cognitively about the story being read). Techniques such as using sequential analyses of parent-child communication could provide insights into their relationships with one another (i.e., what features of parent interactions recruit different types of desired child participation). Sequential analysis refers to a method of studying and analyzing the order and timing of specific behavior or communication acts over time (Brown

& Woods, 2016). Understanding the nuanced ways that parent communication and behavior impact children's communication contributions could lead better ways of supporting parents to use shared book reading to support their children's learning and development. Additionally, future work should continue to investigate parents' and children's use of aided AAC at home, and what interventions can be provided to support child and family outcomes in AAC through sustainable, practical, and socially valid ways.

Implications for Practice

The present study offers evidence of what normal everyday interactions look like for a child with their parent during shared book reading, particularly for elementary-aged children with complex communication needs learning to use aided AAC. There were several key findings that provide implications for practice. We found that children vary widely in how often they communicate, that children rarely use aided AAC devices even when they have them, and that children have different patterns of what their communication actually looks like. One of the most important implications for practitioners such as special education teachers, speech-language pathologists, or other service providers was the evidence that even when a child has access to a speech generating device, they may rarely use it to communicate with their parent in their home setting, at least during the context of shared book reading. Only one participant used their speech generating device during shared book reading, aligning with prior research stating the high rates of abandonment of AAC devices (Moorcroft et al., 2019). Research has concluded a main reason for this is the lack of support families of AAC users feel they receive from professionals (Moorcroft et al., 2020). Therefore, this study provides important implications for educators and service providers to provide family-centered AAC practices that allow families to feel more empowered related to the use of AAC.

CHAPTER V

CONCLUSION

This explorative, descriptive study investigated the nature of children's communication while interacting with their parent during a shared reading, particularly for elementary-aged children who had complex communication needs and were learning to use aided AAC. In addition to learning that children almost never used their speech generating devices to communicate with their parents in this context, another key finding was that children rarely focused their communication on labeling or describing objects, referencing the print, or showing that they were thinking abstractly about the story—each which represent important ways of communicating that can provide a platform for other learning. We also found three different patterns of children's communication, shaped by their communication frequency. It is important to understand what the nature of children's communicative contributions look like with their parent, as communicative interactions between these two partners are bidirectional and transactional. Thus, the findings of this study provide important initial insight that can help shape the development of more effective interventions to support the communication of children with complex communication needs, especially at home.

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