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## How Do Teachers of Deaf Pre-Readers Communicating in American Sign Language Select Storybooks for Read-Alouds?

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Teachers of the d/Deaf (TODs) struggle to select appropriate storybooks for elementary-aged Deaf pre-readers who use American Sign Language (Hayes & Shaw, 1994). Hayes and Shaw (1994) created a book selection system for TODs, but their methodology was difficult to evaluate. The purpose of the present research was to create an empirically derived book selection system using a sorting task methodology that has been successfully adapted for creating book selection systems (Schwarz et al., 2015, 2019). In a pilot study, 16 experienced TODs sorted 14 storybooks from published preschool curricula and explained the thinking behind their selections. Using content analysis and a multi-variate technique, the authors created a book selection system with a two-tiered glossary and 4-point difficulty scale. They discuss how this system can be used with evidence-based read-aloud interventions compatible with the Framework of Early Literacy (Kuntze & Golos, 2021).

**KEYWORDS:** book selection, read-alouds, deaf, American Sign Language, DiSTATIS, sorting task

READING BOOKS aloud to Deaf pre-readers in preschool and kindergarten who communicate in American Sign Language (ASL) is critical to the ASL-English bilingual/bicultural educational philosophy (e.g., Dirks & Wauters, 2015, 2018; Erting & Pfau, 1997; Kuntze & Golos, 2021). This approach was developed to give Deaf children access to a fully developed naturally occurring visual language early in life so that they can experience full cognitive, linguistic, and socioemotional development (see, e.g., Swanwick, 2016).

To realize early literacy development within a bilingual/bicultural educational philosophy, Kuntze and Golos (2021) have proposed the Framework of Early Literacy. This framework (a) describes how Deaf children in a bilingual/bicultural program attain emergent literacy skills and (b) is compatible with two evidence-based shared-reading interventions (e.g., van Kleeck et al., 2006; Zevenbergen & Whitehurst, 2003). These interventions require teachers to select books with a range of difficulty levels, a process found difficult by teachers who serve hearing students

(Damber, 2014; McGee & Schickendanz, 2007) and by teachers serving Deaf pre-readers (Hayes & Shaw, 1994). As a consequence of this difficulty, preschool teachers working with hearing children tend to select storybooks at random (Damber, 2014), and elementary school teachers of hearing children tend to select storybooks that are too simple (McGee & Schickendanz, 2007). In a small study at a school for the Deaf, Hayes and Shaw (1994) reported similar findings. In their study, ASL storytellers determined that 40% of storybooks selected by teachers of the deaf (TODs) for read-alouds that aligned with thematic units for elementary school-age Deaf children were either inappropriate (10% of the books) or unsatisfactory (34%). Unfortunately, Hayes and Shaw did not describe what they meant by “inappropriate” and “unsatisfactory” or how the ASL storytellers arrived at their determinations.

To help TODs serving Deaf students select appropriate storybooks for read-alouds, Hayes and Shaw (1994) developed a book selection system. However, storytellers had difficulty using this system consistently. Our purpose in the present study was to create a book selection system for TODs serving Deaf pre-readers based on a methodology often used in taste and perception research (Chollet et al., 2011) that has been successfully adapted for creating book selection systems (Schwarz et al., 2015, 2019).

To frame our study, we discuss the Framework of Early Literacy (Kuntze & Golos, 2021) and the two evidence-based shared-reading interventions that focus on developing language skills that are compatible with this framework. We discuss existing book selection systems for Deaf pre-readers and why it is necessary to attempt to create a new system. Finally, we provide an overview of research support

for the novel methodology we used to create a book selection system.

## KUNTZE AND GOLOS (2021) FRAMEWORK OF EARLY LITERACY

Emergent literacy skills within an ASL-English bilingual/bicultural educational philosophy are grounded in a multiliteracy framework, such as the Framework of Early Literacy (Kuntze & Golos, 2021). This framework is based on the premise that, for Deaf children, learning to read involves learning a new language. In this framework, interactive communication in a fully accessible language is foundational to a Deaf child’s ability to read. To describe early literacy development, this framework includes four additional components: (a) language development, (b) emergent literacy, (c) literature and media, and (d) identity development.

Although newborns, regardless of hearing status, come ready for language acquisition, they need to have consistent and immersive experiences with a fully accessible language early in life to acquire a fully functional language (e.g., Kuntze & Golos, 2021; Mayberry et al., 2002). Kuntze and Golos (2021) contend that naturally occurring visually based languages—such as ASL—provide Deaf children with language input that is accessible both psycholinguistically and sociolinguistically. Without early and complete access to a language, Deaf children will experience various degrees of language deprivation (Kuntze & Golos, 2021).

In the Framework of Early Literacy (Kuntze & Golos, 2021), language comprehension and word recognition play critical roles in early literacy development. Kuntze and Golos (2021) assert that Deaf children do not need access to auditory input to make connections between ASL and printed English words. Kuntze and Golos

advocate that educators incorporate well-documented read-aloud strategies used by Deaf adults fluent in ASL, highlighting the importance of background knowledge, vocabulary, language structures, verbal reasoning/discourse skills, literacy knowledge, and word recognition. Kuntze and Golos also state that Deaf children need exposure to English in print beginning in infancy so that they can have early experiences with books, other printed material, and discourse mediated by adults fluent in a visually based language, such as ASL. The incorporation of media containing fluent examples of Deaf adults signing ASL is an important element of the Framework of Early Literacy because ASL education videos (Golos, 2010a, 2010b; Golos & Moses, 2013) and technology-enhanced shared reading (Mueller & Hurtig, 2010) have been shown to increase targeted sign vocabulary and various engagement behaviors in Deaf preschoolers.

The last component of the Framework of Early Literacy involves identity development. Kuntze and Golos (2021) reference three facets of identity development. One facet is Deaf preschoolers viewing themselves as members of the Deaf community. Another facet is Deaf children seeing themselves as readers, which means persons willing to incorporate information from texts into “their own personal meaning system” (p. 105). A third facet of identity development is Deaf children’s identification with other cultural and linguistic communities both within and outside the Deaf community. In 2019, Radford and Noe-Bustamente reported that in 2017 approximately 48% of foreign-born children age 5 years and older living in the United States were not proficient in English. Reporting a similar percentage for the years 2011 and 2012, the Gallaudet Research Institute (2013)

indicated that approximately 36% of deaf and hard of hearing children were from homes in which Spanish or another language besides English and ASL were used.

#### READ-ALoud INTERVENTION APPROACHES TO INCREASING LANGUAGE SKILLS THAT ARE COMPATIBLE WITH THE FRAMEWORK OF EARLY LITERACY

The Framework of Early Literacy (Kuntze & Golos, 2021) applies across text genres and encompasses a variety of skills that promote language development (background knowledge, vocabulary, language structures, verbal reasoning/discourse skills) and print referencing (literacy knowledge and word recognition). Research with hearing adults indicates that they use different book selection criteria for read-alouds based on whether books lend themselves to language development or to print referencing because adults use different elicitation strategies with children based on the type of book (e.g., Bradley & Jones, 2007; Chall et al., 1996; Ukrainetz et al., 2000; Zucker et al., 2009). For a synthesis of the sociocultural influence of Deaf adults and the specific elicitation strategies they use to increase language development and promote print referencing based on Deaf pre-readers’ communication language and modality, see Schwarz et al. (2017).

Our focus in the present study was on creating a book selection system for read-alouds meant to increase language skills that are compatible with a bilingual/bicultural educational philosophy for Deaf pre-readers, not print referencing. Therefore, the read-aloud approaches discussed next focus on increasing background knowledge, vocabulary, language structures, and verbal reasoning/discourse

skills, not sound play and word recognition. Because the very important issue of how to translate storybooks into ASL is not addressed by these read-aloud approaches, it is not discussed in the present article.

The three empirically tested read-aloud approaches compatible with increasing language skills are the Text Talk (Beck & McKeown, 2001), dialogic reading, and literal-inferential approaches. We de-emphasize the Text Talk approach to read-alouds in the present article because it is inconsistent with the Framework of Early Literacy (Kuntze & Golos, 2021) and uses practices that contrast with those used by Deaf adults during read-alouds. The purpose of Text Talk is to help children construct meaning from decontextualized language and to help them learn sophisticated vocabulary often found in children's books (e.g., *reluctant*, *nuisance*, *commotion*, *precious*, *envy*). To our knowledge, this approach has only been used with hearing children. In Text Talk, teachers do not show children the illustrations before they read the book or as they read the book. The restriction of visual information during the meaning-making process makes this approach inconsistent with the Framework of Early Literacy and prevents the documented practice of Deaf adults supplementing the storybook text with a description of events in the illustrations (Delk & Weidekamp, 2001; Schleper, 1995a, 1995b). Instead, teachers using Text Talk show the illustrations only after the story is read and after the children have made meaning from the text by correctly answering a series of questions interspersed during the reading. When students do not respond correctly, teachers often re-read the text passage without the aid of illustrations and ask follow-up questions until the students are able to give precise answers. Also, teachers using Text Talk

rarely ask questions to tap the background knowledge of students because students often give off-topic responses (Beck & McKeown, 2001). Text Talk de-emphasizes key strategies used by Deaf adults during read-alouds, namely, following the students' lead (Delk & Weidekamp, 2001; Lartz & Lestina, 1995; Schleper, 1995a, 1995b; Swanwick & Watson, 2007; Watson & Swanwick, 2008) and helping students make personal connections with the storybook (Akamatsu & Andrews, 1993; Andrews & Taylor, 1987; Andrews & Zmijewski, 1997; Berke, 2013; Delk & Weidekamp, 2001; Lartz & Lestina, 1995; Schleper, 1995a, 1995b).

The two empirically tested read-aloud approaches compatible with increasing pre-readers' language development and with the Framework of Early Literacy (Kuntze & Golos, 2021) are the dialogic reading approach (Zevenbergen & Whitehurst, 2003) and the literal-inferential approach (e.g., van Kleeck et al., 2006). When implementing the dialogic reading approach to read-alouds, the adult follows the child's lead. In practice, this means that the adult does not focus on the individual words on the page but instead talks about the illustrations that interest the child. To promote conversational language skills, the adult repeats and expands upon what the child says and also asks open-ended questions. The adult wants the child to enjoy the story, acquire conversational vocabulary and grammatical structures, and develop storytelling skills (Dirks & Wauters, 2015, 2018; Fung et al., 2005; Huebner, 2006; Lederberg et al., 2014; Mol et al., 2008; Trussell & Easterbrooks, 2014; Zevenbergen & Whitehurst, 2003). Dialogic reading has been shown to increase the conversational language skills of hearing toddlers (for reviews, see Huebner, 2006; Mol et al., 2008; Zevenbergen & Whitehurst, 2003) and Deaf pre-readers

(Fung et al., 2005; Lederberg et al., 2014; Trussell & Easterbrooks, 2014), as well as to change how caregivers read books aloud to Deaf toddlers (Dirks & Wauters, 2015, 2018). When selecting books to use with the dialogic reading approach, Whitehurst et al. (1994) advise adults to pick books with illustrations that tell the whole story and depict key vocabulary.

The next empirically tested read-aloud approach that is compatible with increasing language development and with the Framework of Early Literacy (Kuntze & Golos, 2021) is the literal-inferential approach (e.g., van Kleeck et al., 2006). To our knowledge, this approach has been studied only with hearing pre-readers. In the literal-inferential approach, the adult focuses on developing conversational/literal language skills—a strategy similar to the dialogic reading approach—60% to 70% of the time and academic/inferential language skills 30% to 40% of the time (van Kleeck, 2014; van Kleeck et al., 2006). Whereas conversational/literal language focuses on information depicted in the illustrations and/or text, academic/inferential language focuses on information that is not explicitly depicted in the book and/or that goes beyond it. Adults build academic/inferential language during read-alouds by (a) focusing on the perspective, motives, and feelings of characters, (b) discussing cause-and-effect relationships in the story, (c) having children make connections across storybooks and events, and (d) having children define words in the book (van Kleeck, 2014; van Kleeck et al., 2006). This approach has been shown to be effective with hearing preschoolers with language impairment (van Kleeck et al., 2006).

The dialogic reading and literal-inferential approaches to read-alouds are both compatible with the Framework of Early Literacy (Kuntze & Golos, 2021)

because these approaches can be used to promote language development in ASL through literature, a process that encourages Deaf pre-readers to value and identify with texts, to incorporate information from texts into their worldview, and to see themselves as readers. If multicultural storybooks are used in these read-aloud approaches, Deaf pre-readers from multicultural backgrounds may also see themselves not only as part of the Deaf community, but as part of other cultural and linguistic communities as well (Kuntze & Golos, 2021).

To implement dialogic reading and literal-inferential approaches to read-alouds, teachers must be able to select appropriate books. As we have pointed out, teachers struggle with this task, whether they are working with hearing students (Damber, 2014; McGee & Schickendanz, 2007) or Deaf students (Hayes & Shaw, 1994). Although scholars have offered guidelines and book selection systems for read-alouds with children who can hear (e.g., Anderson et al., 2001; Beck & McKeown, 2001; Elster, 1998; Griffin, 1970; Martinez & Roser, 1985; McGee & Schickendanz, 2007; Schwarz et al., 2015), only three book selection systems—which we discuss next—have been created for TODs.

#### EXISTING BOOK SELECTION SYSTEMS CREATED FOR TEACHERS OF THE DEAF

The three book selection systems created for TODs are the Signability Index (Stewart et al., 1992) and the book selection systems of Hayes and Shaw (1994) and Schwarz et al. (2019).

##### Signability Index (Stewart et al., 1992)

Stewart et al. (1990) created a demonstration project for Total Communication

classrooms in Michigan school districts in the late 1980s. In these classrooms, TODs used primarily signed English, with ASL used as an intervention tool to clarify information presented in English. TODs had the option of using ASL as the main language for communication when students were taught ASL and when topics related to Deaf culture were discussed (Stewart et al., 1990, 1992). Importantly, TODs in the demonstration project conducted read-alouds in English and used ASL to explain difficult concepts and difficult passages from English-language children's books (Stewart et al., 1990). If a book or passage from a book was both complex and abstract, Stewart et al. (1990) recommended translating the passage into ASL first and then reading it in English. The Signability Index was one outcome of the demonstration project (Stewart et al., 1990, 1992).

The Signability Index was created for TODs working in Total Communication classrooms from preschool through second grade. The index was meant as a tool for TODs to use to organize books based on how difficult the books were to sign in English sign systems, with ASL used as an intervention tool (Stewart et al., 1990). To create the index, Stewart et al. (1992) followed several steps. In earlier studies for which the given reference is unavailable, Stewart and colleagues had generated a list of variables that affect how teachers read books aloud to Deaf children (see Table 1 for the list). Then Stewart et al. (1992) collected a list of books that TODs enjoyed reading aloud to children. The researchers then narrowed the book list on the basis of the signability of these books by translating each of them into ASL, into English sign, and into simultaneously signed and spoken English. Finally, they adopted a 6-point difficulty scale and sorted the books into the six different difficulty levels presumably based on a gestalt of the 13 characteristics

listed in Table 1. We can find no details about the process Stewart and his colleagues followed or about the reliability they achieved in applying that process.

### Hayes & Shaw (1994) Book Selection System

The book selection system of Hayes and Shaw (1994) was born of disagreements an ASL storyteller had with the Signability Index recommendations when she tried to apply the index while selecting books for video recordings. Hayes and Shaw created their system to help TODs select books for "ASL storytelling sessions" (p. 107), which is a different purpose from that of the Signability Index (Stewart et al., 1992). During the 1992–1993 school year at the Kansas School for the Deaf, Deaf storytellers read 251 books to Deaf children in elementary school, with 60% of the books selected either because TODs thought they were appropriate or because these books were part of thematic units from the curriculum. No information was provided about the storytellers' backgrounds or their ASL skills. Hayes and Shaw randomly selected 10 books from each of five book lists—thus, 50 books in all—and divided the books into the five grade-level ranges: early childhood, kindergarten and first grade, second and third grade, fourth grade, and fifth grade. Hayes and Shaw recruited two storytellers to rate these 50 books on the basis of the storytellers' success (i.e., flow of words/ideas in ASL, enjoyable to children) reading them aloud in ASL, using a 5-point scale: excellent, good, fair, poor, and inappropriate. Then, the storytellers were asked to explain their ratings. Hayes and Shaw and the storytellers met twice weekly for more than a month to create and revise their book selection guidelines. Through this iterative process, they rejected 17 books as

inappropriate. From the reasons the two storytellers gave for their rating decisions, Hayes and Shaw identified five characteristics of books and the three-level scale shown in Table 1.

To evaluate these guidelines, Hayes and Shaw (1994) selected 34 books available in

the Kansas School for the Deaf library from 217 books recommended by two publishers for read-alouds with hearing children. Two attempts to validate the system resulted in low agreement across storytellers (38%, 59% agreement). Hayes and Shaw attributed the low agreement to the fact

**Table 1.** Summary of Book Selection Systems Currently Used by TODs

	<b>Stewart et al. (1990, 1992), Signability Index</b>	<b>Hayes &amp; Shaw (1994) book selection system</b>	<b>Schwarz et al. (2019) book selection system for TODs providing instruction in English</b>
Purpose	To help TODs select books on the basis of how difficult the books are for TODs to sign in English sign systems with ASL features	To help TODs select books for "ASL storytelling sessions" (p. 107)	To help TODs select books on the basis of how difficult the books are for deaf and hard of hearing pre-readers to understand when the books are read aloud to them in English
Literary genres	Different genres, but mainly storybooks meant to increase language comprehension	Mainly storybooks meant to increase language comprehension	Only storybooks meant to increase language comprehension
Grade levels	Prekindergarten through 2nd grade	Prekindergarten through 3rd grade	Prekindergarten and kindergarten pre-readers
Language	English	ASL and English in print	English
Modality	Sign systems with ASL features	Natural sign language	Speech only or speech with an English sign system
Difficulty scale	6-point difficulty scale	3-point difficulty scale: <ul style="list-style-type: none"> <li>• Level A: prekindergarten and kindergarten</li> <li>• Level B: kindergarten and 1st grade</li> <li>• Level C: 2nd and 3rd grade</li> </ul>	6-point difficulty scale with exemplar storybooks for each scale level
Characteristics	<ul style="list-style-type: none"> <li>• Reading rate to maintain children's attention</li> <li>• Sentence length</li> <li>• Language complexity</li> <li>• Repetition</li> <li>• Text density</li> <li>• Word/verbal imagery</li> <li>• Passage complexity</li> <li>• Concreteness</li> <li>• Book length</li> <li>• Plot complexity</li> <li>• Level of ASL skills needed</li> <li>• Ease of signing the story in English</li> <li>• Whether TOD needed sign practice before reading the books aloud</li> </ul>	<ul style="list-style-type: none"> <li>• Illustrations</li> <li>• Plot</li> <li>• Character</li> <li>• Setting</li> <li>• English language/ vocabulary</li> </ul>	<ul style="list-style-type: none"> <li>• Plot/sequence</li> <li>• familiarity subscale</li> <li>• complexity subscale</li> <li>• predictability subscale</li> <li>• Difficulty of vocabulary</li> <li>• Abstractness of concepts</li> <li>• Relatability of background knowledge</li> <li>• Illustrations</li> <li>• supportiveness subscale</li> <li>• detailedness subscale</li> <li>• realism subscale</li> </ul>

Notes. TOD = teacher of the deaf. ASL = American Sign Language.



that storytellers were rating the books on how easy they would be to translate into ASL, instead of applying the guidelines. An additional methodological issue concerned a lack of mutual exclusivity—that is, the first and second levels of Hayes and Shaw’s difficulty scale overlap. Descriptions of book characteristics overlap across levels for (a) illustrations, (b) setting, and (c) English language/vocabulary. Finally, qualifiers of different book characteristics also overlap; see, for example, the book characteristics *illustrations* and *settings*. In Level A (pre-K to kindergarten) and Level B (kindergarten to first grade), the qualifier *illustrations* includes “Pictures are realistic, not abstract.” Also, in Level A and Level B, the qualifier *settings* includes “Setting is usually in the present and/or the past.” This lack of separation between scale levels and qualifiers of book characteristics likely made application of the scale across storytellers and new books quite difficult. Clearly, trying to capture Deaf storytellers’ thinking when they select storybooks is very difficult.

#### Schwarz et al. (2019) Book Selection System for Teachers of the Deaf Providing Instruction in English

The most recent attempt to create book selection systems for TODs comes from a national study Schwarz and colleagues (Schwarz et al., 2017, 2018, 2019) conducted with 84 TODs. This study had several outcomes that explored how the languages (English, ASL) and modalities (speech, sign) that TODs use for instruction of Deaf children affect TODs’ reported literacy practices. This question is important for two reasons. First, adults use storybooks to socialize children into culture-specific language and literacy practices (e.g., van Kleeck, 2006). Second, the language and modalities used in

instruction of Deaf children affect how they are socialized through read-alouds (see, e.g., Andrews, 2012; Gioia, 2001; Nover & Andrews, 1999; Williams, 2012). Furthermore, the research literature provides TODs with contradictory advice. For example, Nover and Andrews (1999) and Schleper (1995a, 1995b) advise adults who sign—regardless of whether they use ASL or English for instruction—to translate storybooks into ASL during read-alouds. Conversely, Williams (2012) advises TODs working in English—regardless of whether English is spoken and/or signed—to read storybooks in English and to employ the same read-aloud strategies used by teachers working with children who can hear and are in general education classrooms.

Schwarz and colleagues found that the language and modality TODs use for instruction have different effects based on the literacy outcome. For example, in survey responses, TODs providing instruction through simultaneously spoken and signed English reported reading significantly more storybook text compared to TODs providing instruction through ASL (Schwarz et al., 2018). However, TODs reported making similar decisions based on the language (English, ASL) they used for instruction, not the modality (speech, sign), when reporting read-aloud goals (Schwarz et al., 2018), and when reporting on the criteria they used to select storybooks for read-alouds. This national study resulted in two separate book selection systems—one for TODs providing instruction through English (Schwarz et al., 2019), which we describe below, and one for TODs providing instruction through ASL, which is also described in the present article.

During the national study and after completing surveys about their literacy practices, TODs participated in the

book-sorting activity (described in detail in the Method section), which is summarized here. First, TODs previewed 14 storybooks (presented in a randomized order for each participant) at their own pace as they would typically do when evaluating a storybook for a read-aloud. For each storybook, the TODs answered questions about their familiarity with and preference for each book. An examiner then asked each TOD to sort the books on the basis of how difficult the TOD thought the books would be for deaf preschoolers and/or kindergarteners to understand when the books were read aloud to them. The TODs did not receive guidelines for sorting the storybooks and were encouraged to sort them into as many groups or stacks as they thought necessary. This approach allowed us to capture each TOD's individual difficulty scale. For each stack of storybooks created by each TOD, the examiner asked the TOD to explain why they stacked each set of books together. After describing the attributes of each stack, the examiner asked the TOD to describe why they placed each book in each stack.

Recall that the objective of the national study was to explore how the language and modality that TODs use in instruction affect several literacy outcomes, one of which is how they select storybooks for read-alouds. For this reason, a series of preliminary multivariate analyses using DiSTATIS were performed on the book-sorting data only (see the Method section for details about DiSTATIS). We wanted to know whether TODs sorted books differently based on the primary language (English vs. ASL), modality (speech vs. sign), and instructional approaches (Spoken English only, simultaneously spoken and signed English, and bilingual/bicultural) that the TODs reported using. These preliminary multivariate analyses showed different sorting

patterns for the storybooks based on the language TODs used for instruction (English, ASL). For example, TODs providing instruction in English collectively sorted the books using a 6-point difficulty scale while TODs providing instruction in ASL collectively sorted the books using a 4-point difficulty scale. A full content analysis, which is discussed in detail in the Method section, was conducted on the TODs' explanations of why they placed each book in each stack. The content analysis also revealed differences in how the two groups of TODs evaluated the books.

The book selection system based on the judgments of TODs providing instruction in English (Schwarz et al., 2019) is summarized in Table 1. This system is based on 11 of the 14 storybooks used in the present study because the majority of TODs providing instruction in English did not like *The Ugly Duckling*, *Abuela's Weave*, and *June 29, 1999*. Full publication information on the 14 storybooks appears in Table 3, along with shorthand forms of the books' titles, which are used throughout the remainder of the present article.

The multivariate analysis of the TODs' sorting data and the content analysis of their reasons for sorting each book as they did indicate a 6-point difficulty scale. The content analysis identified the five book characteristics shown in Table 1 and the subscales within the plot/sequence and illustrations book characteristics. Differences between book selection systems based on TODs providing instruction in English and TODs providing instruction in ASL are discussed further in the Discussion section. Having summarized the three book selection systems currently available for TODs, we now provide a brief explanation of the novel sorting task methodology we used in the present study.

## Sorting Tasks: Often-Used Methodology for Identifying How People Categorize Information

Using similarity decisions in sorting tasks is a popular statistical methodology in taste and perception research (e.g., beer, wine, or olive oil tasting) because of its efficiency and potential for strong validity. Sorting tasks draw on participants' natural ability to group items on the basis of sensory and perceptual similarities, and participants are encouraged to sort the items into as many groups as they want (Chollet et al., 2011). Often, researchers also have participants explain their decisions after completing the sorting task (e.g., Blancher et al., 2007; Chollet et al., 2011; Patris et al., 2007; Santosa et al., 2010; Tang & Heymann, 2002).

In taste and perception research, data are typically analyzed in two steps. In the first step, multivariate statistics are used to analyze the participants' sorting data. These results are represented on maps that identify major sources of variance in the data and show how the participants sorted the stimuli (e.g., types of beer or wine). Stimuli that the participants sorted similarly are plotted in close proximity on the maps, whereas stimuli that are rarely sorted together are plotted far away from each other on these maps. In the second step, words and phrases used by the participants to describe their sorting decisions are overlaid onto the map to help explain why participants sorted groups of stimuli similarly. Schwarz and colleagues have adapted the sorting task described above to create book selection systems, one for speech-language pathologists (Schwarz et al., 2015) and one for TODs providing instruction in English (Schwarz et al., 2019). In both studies, Schwarz and colleagues had participants sort a set of storybooks (but not the same set) on the

basis of how difficult the participants thought the books would be for pre-readers (speech-language pathologists: children at the preschool language level; TODs: Deaf pre-readers receiving instruction in English). In each study, Schwarz and colleagues used the number of groups their participants (speech-language pathologists, TODs) collectively created as the number of levels on the difficulty scale. In both of these studies, the book selection systems are shown in a table, with the levels of difficulty scales and the representative storybook(s) for each scale level displayed as column headers. The rows of the table include the book characteristics described by the participants. The cells within the table for each difficulty level include words showing how the participants qualified particular book characteristics. In the present study, we extended this methodology to a new population of educators, TODs who provide instruction in ASL to Deaf preschoolers and kindergarteners.

## SUMMARY AND RESEARCH QUESTION

The Framework of Early Literacy (Kuntze & Golos, 2021) focuses on fostering Deaf pre-readers' emergent literacy skills by building Deaf children's linguistic, social, and cognitive development through ASL with English promoted only through print. Two of the three evidence-based read-aloud intervention approaches that focus on building language skills—dialogic reading and the literal-inferential approach—are compatible with the Framework of Early Literacy, with dialogic reading focusing on mostly conversational language and the literal-inferential approach bridging to academic language. These two read-aloud interventions require teachers to select storybooks at different difficulty levels, a task that teachers of

hearing students (Damber, 2014; McGee & Schickendanz, 2007) and Deaf students (Hayes & Shaw, 1994) find difficult.

The book selection system of Hayes and Shaw (1994) is the only one currently available to TODs that provides instruction in ASL to Deaf children. Unfortunately, for several reasons this system does not meet the needs of TODs serving Deaf pre-readers receiving instruction in ASL. The 3-point difficulty scale of the Hayes and Shaw system spans multiple grade levels, with scale levels overlapping. For example, kindergarten is included in both Levels 1 and 2. Besides the lack of mutual exclusivity in the difficulty scale levels, the Hayes and Shaw difficulty scale does not capture the difficulty range of storybooks used in read-alouds with preschoolers and kindergarteners, which was our objective in the present study. Also, when storytellers tried to apply the Hayes and Shaw system, they achieved low agreement because they misapplied the scale. Instead of applying the guidelines to the storybooks, storytellers focused on how easy the books would be to translate into ASL. Also, the Hayes and Shaw system was only piloted at one school. To address these issues, we created a book selection system for TODs serving Deaf pre-readers using a well-tested and often-used methodology adapted from the taste and perception literature and successfully used to create other book selection systems (see Schwarz et al., 2015, 2019). We also collected data from TODs working in different regions of the country. Our specific research questions are listed below. Note that these research questions are the same ones as those found in the Schwarz et al. (2019) book selection system because the process of creating a book selection system using our methodology is the same regardless of the population of educators.

1. After sorting storybooks from preschool curricula, what terms do TODs use when describing their reasons for placing a book in a particular stack?
2. What are the patterns of similarity and dissimilarity in the stacks created by TODs when sorting the storybooks?
3. When the TODs' descriptive terms for the storybook stacks (Q1) are superimposed onto the storybook stacks identified in the multivariate analysis (Q2), which terms best describe each storybook stack?
4. As a group, what are the overall levels of difficulty TODs identified, and which storybooks best represent each level of difficulty?

## METHOD

Ethics approval was granted by the Texas State University Internal Research Review Board (2015Q3357).

### Participants

Data from the present study are part of a larger study exploring the preliteracy practices of 84 experienced teachers of d/Deaf and hard of hearing pre-readers. Deaf pre-readers were not included in the larger study or in the present study, which included the 16 TODs serving Deaf pre-readers. To participate, TODs had to have 2 or more years of experience, current or previous, teaching Deaf pre-readers at any level, and had to have experience teaching Deaf preschoolers or kindergarteners who used ASL. We did not assess the TODs' fluency in ASL. We assumed that the TODs were qualified to work with Deaf pre-readers being educated in bilingual/bicultural programs because of where they worked. This is a limitation of our study.

In Phase 1, the first author recruited five TODs through deaf education programs that included four or more TODs working with preschoolers and/or kindergarteners. After receiving a recruiting email, interested school administrators contacted the first author to schedule videoconferences. In Phase 2, the first author recruited 11 TODs in 2016 at three conventions focusing on the education of d/Deaf and hard of hearing students in Kentucky, Colorado, and Texas. The TODs in the present study lived in three different U.S. Census regions: 12 in the South, two in the Midwest, and two in the West. The highest level of educational attainment was a master's or doctoral degree for 14 TODs and a bachelor's degree for two TODs. The TODs had a mean of 14.50 years of experience ( $SD = 6.32$  years,  $min = 3.00$ ,  $max = 25.00$ ). Fifteen TODs were female and one was male. Thirteen TODs identified as Caucasian and three TODs chose not to report race/ethnicity. Six self-reported as having a profound hearing loss, two self-reported as being hard of hearing, and eight self-reported as being hearing. Ten TODs identified as members of the Deaf community. Ten TODs worked in public schools and six TODs worked at state schools for the deaf. Fifteen TODs worked as classroom teachers and one worked as an itinerant teacher who drew on her experience as a classroom teacher while participating in the study. The 16 TODs included an average of 6.25 read-alouds each week ( $SD = 3.00$ ,  $min = 4.00$ ,  $max = 13.00$ ), with an average of 5.84 students ( $SD = 2.42$ ,  $min = 1.50$ ,  $max = 9.00$ ) each time.

### Storybook Selection

We identified authentic children's books included in preschool curricula in the United States by searching the websites of

the largest 100 schools listed in the *American School & University* online magazine in September 2014 (Nolin, 2014) and the roster of educational programs for deaf and hard of hearing children on the Laurent Clerc National Deaf Education Center (2015) website. Of the 25 preschool curricula identified, seven publishers posted the storybook lists online. From a master list of 348 storybooks, we located 201 storybooks in the first author's university library. Three undergraduates coded these storybooks into Lynch-Brown and Tomlinson's (2008) 11 definitions of children's literature, as summarized in Schwarz et al. (2019):

1. picture storybooks that tell a fictional narrative through pictures and words
2. baby books
3. interactive books that invite recitation and chanting
4. toy books (e.g., pop-up books)
5. wordless picture books
6. concept books (i.e., alphabet books, counting books, idea books, color books)
7. pattern books (i.e., decodable picture books, predictable books, sight word books, books with sound play)
8. picture books with chapters
9. picture books with mostly talk bubbles or graphic novels
10. dual-language books that tell the whole story in both English and another language
11. easy readers containing simplified text for children to read independently (p. 10)

The definition important for the present study was *picture storybooks that tell a fictional narrative through pictures and words*. As we have already noted, hearing adults use different book selection criteria for read-alouds based on whether books

lend themselves to language development or to print referencing (e.g., Bradley & Jones, 2007; Chall et al., 1996; Ukrainetz et al., 2000; Zucker et al., 2009). Recall that our purpose was to create a book selection system for read-alouds meant to increase language skills that are compatible with a bilingual/bicultural educational philosophy for Deaf pre-readers. Lynch-Brown and Tomlinson's definition of picture storybooks that tell a fictional narrative through pictures and words best aligned with our purpose. After iterative training on applying the 11-item coding scheme to 32 books, the undergraduates applied the coding scheme to the remaining 169 storybooks. The undergraduates agreed that 73 storybooks told a fictional narrative through pictures and words, achieving a Fleiss kappa of .90. After interjudge reliability was calculated, the coders and the first author met to discuss each disagreement in coding. Coder fatigue caused most of the disagreements that were then resolved by consensus.

We also only included books listed in the MetaMetrics database. MetaMetrics, a privately owned company, markets a database of Lexile scores (MetaMetrics, 2014), which are recommended by the National Governors Association Center for Best Practices and Council of Chief State School Officers (2012). Lexile scores are a composite variable reflecting both the reading comprehension level of a given student and the complexity of a given text. Text complexity is based on sentence length and vocabulary. Although Lexile scores apply to readers, not pre-readers, they are a commonly used complexity measure. Sixty-nine of the 73 storybooks were included in the MetaMetrics database. As discussed next, we used Lexile scores to ensure a broad distribution of text complexity in the storybooks ultimately selected for the present study.

Sorting tasks require 9–20 items—with an optimal number of 12 items—to find a stable pattern (Chollet et al., 2011). We used 14 storybooks in case the TODs rejected one or two from those we selected. We quasi-randomly selected the 14 storybooks for the present study, as well as 14 additional storybooks for a future validation study, from the 69 storybooks, applying three criteria: (a) The distribution of Lexile scores present in the 69 storybooks was also present in both sets of 14 storybooks. (b) A storybook author appeared only once in the list of 14 storybooks. (c) The distribution of multicultural characters/themes in both sets approximated 36%, which is the percentage of deaf and hard of hearing children who are from homes in which Spanish or another language besides English and ASL is used (Gallaudet Research Institute, 2013). This decision is compatible with the Framework of Early Literacy (Kuntze & Golos, 2021) because Deaf children need to see their cultural and linguistic communities represented in the storybooks they are exposed to in order to identify with the material.

## Procedure

The sorting task methodology used in the present study was adapted from the large number of sorting task methodologies used in the taste and perception literature (see, e.g., Chollet et al., 2011), and was previously used in the Schwarz et al. (2015) book-sorting study with speech-language pathologists and in the Schwarz et al. (2019) book-sorting study with TODs providing instruction in English. In the present study, TODs providing instruction in ASL sorted the books. Each TOD was asked to group storybooks on the basis of how difficult the TOD thought the books would be for pre-readers to understand

when the books were read aloud to them. Examiners trained the TODs on the procedures of the study. Examiners included liaisons at participating school districts and state schools for the deaf, graduate research assistants, and undergraduate research volunteers.

A 1½-hour video and script were created to train examiners on the consent process and on conducting the sorting study. Undergraduates who served as examiners also received one live simulation with a trainer. To ensure that TODs received a similar experience during the sorting task procedure, examiners read a script providing step-by-step instructions to the TODs. Each TOD met separately with an examiner unless the TOD requested an interpreter. These interpreters were provided in one of two ways: Participating state schools for the deaf provided their own interpreters internally. For all other TODs who requested an interpreter, the first author provided interpreters through Linguabee (<https://www.linguabee.com/>), a Deaf-owned business that matches ASL interpreters with clients. When interpreters were used, they were present during the entire experimental procedure. All meetings were audio-recorded.

A random number generator was used to create a unique order of the 14 storybooks for each TOD. On average, TODs completed the sorting procedure in 53 minutes (range: 32–74 minutes). Once the TODs gave consent, they completed surveys collecting demographic data, their read-aloud practices, and preferences for and familiarity with the 14 storybooks. TODs had access to the 14 storybooks when they completed these surveys. Each TOD was given the 14 storybooks at one time and asked to sort the books into as many stacks as necessary according to how difficult the TOD thought the books would

be for Deaf preschoolers or kindergarteners to understand when the books were read aloud to them. TODs did not read the books aloud in ASL. We decided to let the TODs determine by themselves their number of difficulty levels (i.e., stacks) rather than impose these levels, because forcing the TODs to use a number of categories that did not match their own would have made the task more difficult for them and therefore would likely have increased the noise in their responses. The examiners did not provide TODs with guidelines. TODs were encouraged to create as few or as many stacks of storybooks as they considered necessary to capture the different levels of difficulty found in the 14 storybooks. Next, the examiner asked each TOD to describe the characteristics of each stack of books (stack-level descriptions), and then to describe why the TOD placed each book in each stack (book-level descriptions). TODs were allowed to re-sort the books when giving their descriptions. On the few occasions when TODs re-sorted, the examiner asked them to provide their stack-level and book-level descriptions again so that their descriptions would reflect how their thinking had changed.

### Fidelity

Fidelity was not calculated on the interpreters' ability to translate the experimental protocol. The experimental script was administered by the first author, study liaisons at remote data collection sites who participated during the first phase of recruiting, and student researchers. One graduate student calculated fidelity across examiners by comparing the written transcriptions of the audio-recorded experimental sessions to the master experimental script on a word-for-word basis. For data from four TODs, it was not

possible to calculate fidelity because the interpreters translated the experimental protocol into ASL. These four TODs received the same information and progressed through the same stages of the experimental protocol as the other TODs. For the remaining 12 participants, the average item agreement on a word-for-word basis was 94.82% correct. Data on interobserver agreement were not collected on fidelity; this was a limitation of the study.

### Analysis Plan

We used a mixed-methods design that included a qualitative content analysis of the TODs' descriptions of their sorting behavior, which we used to identify key book characteristics, and a quantitative multivariate analysis of the TODs' sorting data. The particular multivariate analysis tool—DiSTATIS—allowed for the key book characteristics to be superimposed onto a map of the sorting data, thus integrating both analyses into one. We derived our book selection system from this integrated analysis. We describe the process below according to the research questions.

#### *First Question: What Terms Do TODs Use to Describe Their Ranked Stacks of Books?*

We applied content analysis (Schreier, 2012a; Weber, 1990) to the transcribed audio recordings of the TODs' stack-level and book-level descriptions. The unit of analysis was the category. In our case, a category is a mutually exclusive collection of words, phrases, sentences, and series of sentences with different meanings that, when taken together, describe one theme that the TODs considered important when assessing the difficulty level of the story-books (Schreier, 2012a; Weber, 1990). Our coding system evolved through both

concept-driven and data-driven processes (Schreier, 2012a). Following a concept-driven process, we considered the book characteristics identified by prior research (Schreier, 2012a), including (a) Hayes and Shaw's (1994) read-aloud selection guidelines, (b) Schwarz et al.'s (2019) book selection system based on the judgments of TODs serving deaf and hard of hearing pre-readers who communicate in spoken and/or signed English, and (c) Schwarz et al.'s (2015) book selection system based on the judgments of speech-language pathologists.

The research team included two pairs of undergraduate students and the first author. Each pair of undergraduate students met to complete all steps in the coding process. When piloting coding processes in previous studies (Schwarz et al., 2019), the first author had found that having two undergraduates review data and make coding decisions together increased reliability.

Following Schreier's (2012b) three-step data-driven process of open coding, we randomly selected 25% of the interview data (interviews from four participants) to create a pilot coding scheme. In Step 1, two pairs of undergraduates and the first author independently and repeatedly re-read the TODs' transcribed interview data for this data subset to identify relevant categories. This iterative process revealed similarities and dissimilarities in the way TODs used concepts (Schreier, 2012b). In Step 2, the research team met to identify similarities in the relevant categories. In Step 3, the research team differentiated between superordinate categories and subordinate categories in the coding scheme, developing a two-level coding scheme. The coding system's first tier included the superordinate categories—the major book characteristics—mentioned by the TODs. All book characteristics



(i.e., superordinate categories) were coded (exhaustiveness requirement), and each main category captured one concept (unidimensional requirement), was mutually exclusive from other main categories (mutual exclusivity requirement), and was coded at least once (Schreier, 2012b).

- We did not code TODs’ comments that were unrelated to the stack-level and book-level descriptions.
- We coded only qualified categories (e.g., “The illustrations are very muted. There isn’t enough color” was coded “IL [illustrations]: unappealing”).
- When a TOD repeated a category while describing a stack of books or an individual book, we only coded the category once.
- When a TOD made contradictory or revisionary statements, the final idea the TOD expressed was coded rather than the original idea.

Following Schreier (2012c), we piloted the coding scheme for the book characteristics in a three-phase process. Schreier recommends selecting a percentage of the data for piloting the coding scheme that will allow for categories to be coded multiple times and will account for variability in the data. We used half of the remaining data (interviews with six TODs, 37.50% of the data) for this purpose. First, the pairs of coders applied the decision rules and categories to this subset of data, achieving 73.10% average agreement, and then to the remaining data, achieving 73.81% average agreement. We also used a data-driven approach to identify the qualifier scales that defined each book characteristic, the subordinate tier of our coding scheme.

We used only the TODs’ book-level descriptions to extract qualifiers for each book characteristic because these

descriptions provided more details. Qualifiers included single words or short phrases the TODs used when relating their book-level descriptions. A list of 82 qualifiers across categories, storybooks, and participants was compiled. The first author extracted several scales from the list of qualifiers and generated a draft of standardized qualifier scales for each of the initial book characteristics, a process that reduced the list to 59 unique qualifiers. Table 2 presents an example of how the 6-point standardized qualifier scale was created for the *Abstractness* book characteristic/category.

A coding manual was created that included the 59 unique qualifiers

**Table 2.** Example of How the 6-Point Qualifier Scale for the Abstractness Book Characteristic/Category Was Extracted From the List of TODs’ Statements/Qualifiers

What the TODs said/their qualifiers	The standardized qualifier assigned
Concrete Relatable Simple Very simple Familiar Accessible	Concrete
Little bit abstract Kind of get the concept Little bit harder Somewhat abstract	Little abstract
More abstract Little more abstract Harder Higher	More abstract
Abstract Hard Hard to understand High level Lots of abstract concepts Difficult	Abstract
Very abstract Extremely abstract	Very abstract
Too abstract Too heavy Too hard Too difficult Too high	Too abstract

Notes. TOD = teacher of the deaf.

(e.g., *concrete*) and examples of qualifying statements made by the TODs in the interview data (e.g., *concrete, relatable, simple, very simple, familiar, accessible*). To distinguish between levels of the qualifier scales for particular book characteristics/categories, pairs of coders matched the TODs' qualifying statements to those shown in the code book and then assigned the standardized qualifier to the qualifying statement.

We applied the first step of open coding (Schreier, 2012c) to refine the standardized qualifier scales and to identify the decision rules needed to consistently apply the scales. First, we randomly selected 20% of the list of qualifiers for each book characteristic. The pairs of coders compared the list of unstandardized qualifiers for 20% of the data several times to the draft of the standardized list of qualifiers in an iterative process to refine the standardized qualifier scales and to develop decision rules for their consistent application. The two coding rules were:

- If a TOD mentioned more than one qualifier when discussing a particular book characteristic, only the first qualifier was coded.
- Qualifiers that did not match a level of one of the standardized qualifier scales were not coded.

Following Schreier (2012c), we piloted the application of the list of standardized qualifier scales to a larger portion of the data, using 37.50% of the data and then the remaining data. The pairs of coders achieved 96.88% and 92.31% average agreement, respectively.

We wanted our book selection system to represent the perspective of most TODs, and so we narrowed the list of initial book characteristics to those mentioned by most TODs about most storybooks. This final

data reduction resulted in five key book characteristics, with one standardized qualifier scale per book characteristic (thus, five scales) that contained a total of 19 individual qualifiers. Table 4, in the Results section, shows the two-tiered glossary of book characteristics and standardized qualifier scales.

### *Second Question: How Did TODs Sort the Storybooks?*

DiSTATIS is a generalization of metric multidimensional scaling that is particularly suited for sorting tasks (Abdi et al., 2007, 2012). DiSTATIS is used to analyze multiple distance tables collected on the same set of stimuli (Abdi & Valentin, 2007; Abdi & Williams, 2010; Abdi et al., 2012). As noted above, each TOD ranked the storybooks into stacks on the basis of how difficult the TOD thought the books would be for Deaf pre-readers to understand when the books were read aloud to them. So, each TOD created a unique difficulty-level scale, and assigned numbers to the storybook stacks beginning with 1 for the easiest stack to the greatest number for the hardest stack. This numbering convention allowed for the (Euclidean) distance between two books to be computed as the square root of the sum of squares of the difference between the numbers the TODs assigned to the storybook stacks they created. Consequently, storybooks stacked together had a zero distance from each other and had the same relative distance to the storybooks in each of the other stacks. For each TOD, a distance table was created that included the distances of the storybooks, which resulted in 16 distance tables for analysis.

From these 16 distance tables, DiSTATIS generated two maps: (a) a participant map and (b) a stimulus map. Both of these maps are obtained by computing orthogonal components (with a process similar to

multidimensional scaling or principal component analysis) and then using the values from these components as coordinates to plot the maps. The participant map describes the pattern of similarity between the TODs' storybook sorting behavior. The stimulus map describes the pattern of similarity between storybooks based on the TODs' sorting decisions. To do this, DiSTATIS creates new (orthogonal) variables—called components—that capture the main sources of variance between storybooks. In practical terms, these components are the coordinates of the storybooks plotted on the two axes shown on the stimulus map. DiSTATIS also plots a 95% confidence interval ellipsoid around each storybook on the stimulus map, which helps identify groups of roughly equivalent storybooks. The distance between groups of storybooks gives insight into the degree of difference in how TODs collectively viewed the storybooks.

*Third Question: How Do the Book Characteristics and Qualifiers Align With Each Stack of Storybooks When They Are Superimposed Onto the Map of Storybooks?*

We used DiSTATIS to create a new map that superimposed (i.e., projected) the book characteristics and qualifiers (Question 1) onto the stimulus map (Question 2). This new map showed which book characteristics and qualifiers the TODs collectively used when describing their storybook stacks. This information helped us interpret the collective meaning the TODs assigned to each group of storybooks.

*Fourth Question: What Are the Overall Levels of Difficulty TODs Identified, and Which Storybooks Best Represent Each Level of Difficulty?*

We used the (bootstrapped derived) confidence interval ellipsoids on the stimulus map to identify the possible number of difficulty levels collectively identified by the TODs. Then, we ordered the difficulty levels based on the TODs' descriptions for each group. We created a Likert-type scale in the form of a table. We used the levels of difficulty identified by storybooks as the column headers, ordered by level of difficulty, with the easiest level on the far left and the hardest level on the far right. The row headers in the table were the book characteristics. The remaining table cells contained the qualifiers that aligned with the difficulty levels (column headers) and book characteristics (row headers). To identify the exemplar books for each difficulty level, we applied these rules.

- When two books occupied the same difficulty level, either book could serve as the exemplar book.
- When a difficulty level included more than two books, the storybook with the intermediate component score was chosen as the exemplar book.

## RESULTS

### TODs' Preferences for the Storybooks

Recall that TODs completed a survey about their preferences for and familiarity with the 14 storybooks. Table 3 shows the TODs' storybook preferences and familiarity. All the storybooks were preferred by at least half of the TODs, so all of the storybooks were included in the analysis.

TODs' familiarity with the storybooks ranged from 18.75% (three TODs) to 93.75% (15 TODs). TODs' preferences for the storybooks ranged from 50.00% (eight TODs) to 93.75% (15 TODs). In the Schwarz et al. (2019) book-sorting study

**Table 3.** Storybook Preferences and Familiarity by Book Type

Book title	Shorthand title	Lexile scores as of February 2016	Preferences for storybooks <sup>a</sup>	Familiarity with storybooks
<b>Books with only animals as characters</b>				
Henkes, K. (2000). <i>Wemberly Worried</i> . HarperCollins.	<i>Wemberly</i>	AD170L	92.31%	56.25%
Bourgeois, P. (2014). <i>Franklin Has a Sleepover</i> . Kids Can Press.	<i>Franklin</i>	380L	84.62%	56.25%
Zemach, M. (1998). <i>The Three Little Pigs</i> . Farrar, Straus & Giroux.	<i>Pigs</i>	AD510L	78.57%	93.75%
Heine, H. (1982). <i>Friends</i> . McElderry Books.	<i>Friends</i>	AD670L	85.71%	37.50%
<b>Books with people as characters but no multicultural characters or themes</b>				
Keats, E. J. (2000) <i>Dreams</i> . Puffin Books.	<i>Dreams</i>	AD60L	66.67%	25.00%
Cauley, L. (1979). <i>The Ugly Duckling</i> . Harcourt Brace Jovanovich.	<i>Duck</i>	AD520L	56.25%	87.50%
Sendak, M. (1963). <i>Where the Wild Things Are</i> . HarperCollins.	<i>Wild</i>	AD740L	93.75%	100.00%
Wiesner, D. (1992). <i>June 29, 1999</i> . Clarion Books.	<i>June</i>	AD750L	50.00%	18.75%
Pinkney, J. (2007). <i>Little Red Riding Hood</i> . Little, Brown.	<i>Red</i>	AD840L	60.00%	87.50%
<b>Books with people as characters and with multicultural characters or themes</b>				
Pak, S. (1999) <i>Dear Juno</i> . Penguin Group.	<i>Dear</i>	AD390L	90.91%	18.75%
Mora, P. (1994). <i>Pablo's Tree</i> . Simon & Schuster Books for Young Readers.	<i>Pablo</i>	410L	64.29%	33.33%
Muth, J. J. (2003). <i>Stone Soup</i> . Scholastic Press.	<i>Stone</i>	480L	87.50%	93.75%
Kleven, E. (2000). <i>Hooray, a Piñata!</i> Puffin Books.	<i>Piñata</i>	500L	62.50%	43.75%
Castañeda, O. S. (1993). <i>Abuela's Weave</i> . Lee and Low.	<i>Abuela</i>	AD960L	58.33%	50.00%

Notes. AD = code for "adult-directed."

<sup>a</sup> The denominator changes because not all teachers of the deaf completed this part of the questionnaire.

with TODs using English, we removed storybooks from the analysis if more than 50% of the TODs did not prefer particular storybooks. As shown in Table 3, at least 50% of the TODs preferred all the storybooks. Recall that we asked TODs to sort the storybooks on the basis of how difficult

they would be for Deaf pre-readers to understand when the books were read aloud to them. The possibility exists that the TODs might have sorted the books on the basis of their preferences and familiarity. Having this information helped us confirm in our analysis whether the TODs

sorted the books on the basis of difficulty, as we requested.

The second column in Table 3 includes the MetaMetrics Lexile scores for each book. As we have explained, a Lexile score is a composite variable reflecting the reading comprehension level of a given independent reader as well as the complexity of a given text (based on sentence length and vocabulary). The AD designation at the beginning of Lexile scores stands for *adult directed* and identifies the storybooks that the MetaMetrics curriculum specialists think are particularly appropriate for read-alouds. According to Lexile scores, the book with the least complexity (so potentially the easiest for independent readers to understand) was *Dreams* and the book with the most complexity was *Abuela's Weave* (so hardest for an independent reader to understand). Our focus is on language comprehension, not reading comprehension. We have included Lexile scores for the books because if TODs had sorted the storybooks on the basis of difficulty, and the order in which they sorted the books was similar to

the Lexile score gradient shown in Table 2, TODs could just use the Lexile scores to select books for read-alouds and would not need the Hayes and Shaw (1994) book selection system or the one we created in this pilot study.

### First Question: What Terms Do TODs Use to Describe Their Ranked Stacks of Books?

Table 4 shows the two-tiered glossary of book characteristics and standardized qualifier scales derived from the content analysis.

We did not give TODs any guidance on how to sort the storybooks. The two-tiered glossary in Table 4 contains the book characteristics/categories (first column) that the majority of TODs mentioned (third column) about the majority of the storybooks (fourth column) when (a) describing the characteristics of each stack they created and (b) when describing why they put each storybook in each stack. The standardized qualifier scales for each book characteristic/category

**Table 4.** Two-Tiered Glossary of Book Characteristics and Standardized Qualifier Scales Extracted From the Content Analysis

Category	Standardized qualifier scales	% of books (N=14) <sup>a</sup>	% of TODs (N=16) <sup>a</sup>
Concept (CO)	<i>Abstractness scale</i> : concrete (CO.concrete), little abstract (CO.little), abstract (CO.ab), more abstract (CO.m), very abstract (CO.vab), too abstract (CO.tab)	78.57%	68.75%
Background knowledge (BK)	<i>Relatability scale</i> : very relatable (BK.vr), relatable (BK.r), maybe relatable (BK.maybe), less relatable (BK.lr), unrelatable (BK.ur)	78.57%	81.25%
Illustrations (IL)	<i>Appeal scale</i> : appealing (IL.app), unappealing (IL.unapp)	85.71%	68.75%
Translation (TR)	<i>Difficulty-level scale</i> : easy (TR.easy), somewhat difficult (TR.some), difficult (TR.diff), very difficult (TR.very)	85.71%	50.00%
Plot/sequence (PS)	<i>Familiarity scale</i> : Familiar (PS.fam), unfamiliar (PS.unfam)	50.00%	62.50%

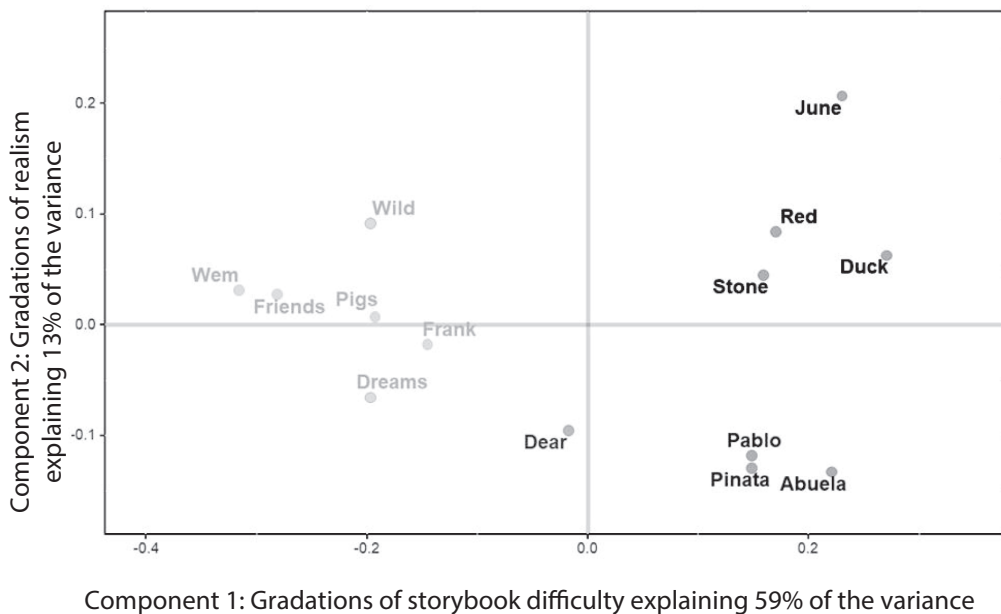
<sup>a</sup> The percentage of books to which each book characteristic was applied and the percentage of teachers of the deaf who mentioned each book characteristic

(second column) are based on the reasons the TODs gave for putting each book in each of the stacks they created after sorting the books on the basis of difficulty. Concerning the *Translation* category, we did not ask the TODs about their opinion on the ease or difficulty of translating each storybook. It just happens that most of the TODs (85.71%) mentioned *translation* when describing how difficult they thought books would be for Deaf pre-readers to understand when the books were read aloud to them. Our procedure (see the Method section) for sorting the books and for describing the books made no mention of educational interpreters. For this reason, we assume that in their discussion of the *Translation* category, the TODs described their own view of translating the storybooks into ASL. In this pilot study, we did not assess the TODs' ASL skill levels. We assumed that the TODs were qualified to work with Deaf pre-readers being educated in bilingual/bicultural programs.

### Second and Third Questions: How Did TODs Sort the Storybooks and How Do the Terms Explain the TODs' Sorting Decisions?

When the data were examined for outliers, none was found, so the stimuli map shown in Figure 1 shows agreement among TODs. The TODs created a minimum of two and a maximum of eight storybook stacks. DiSTATIS revealed two important components in how TODs sorted the storybooks that together explain 72% of the variance. These two patterns—called components—are unrelated, because they are, by construction, uncorrelated (i.e., orthogonal). The first component—storybook difficulty—explains 59% of the variance and is represented on the horizontal axis. The second component—realism—explains 13% of the variance and is represented on the vertical axis. Below, we explain how we arrived at this interpretation.

Figure 1. Combined Two-Dimensional Map of How the TODs Collectively Sorted the Storybooks



Notes. TOD = teacher of the deaf. See the text for an explanation of the grayscale color scheme.

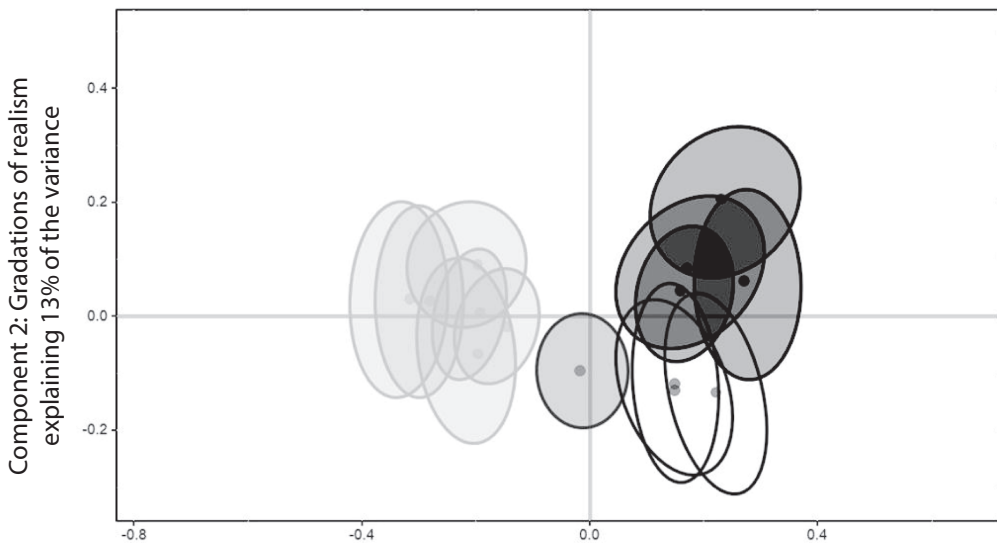
In Figure 2, dots represent storybooks, and the confidence interval ellipsoids surrounding each dot are 95% confidence intervals (CIs) computed by bootstrap resampling (see Abdi et al., 2012, for details) performed from the individual sorting matrices produced by the TODs. TODs consistently sorted together storybooks that are plotted near each other. Individual storybooks and groups of storybooks (created by overlapping CIs) are considered significantly different from one another at  $p < .05$  when CIs do not overlap. As Table 3 showed, the TODs were generally unfamiliar with *June 29, 1999*, *Dear Juno*, *Dreams*, *Pablo's Tree*, and *Friends*. So, did the TODs' relative unfamiliarity with these storybooks influence their sorting decisions? If this had been the case, DiSTATIS would have plotted these storybooks in a similar location in Figure 1. However, DiSTATIS's plotting of these storybooks spread across all four quadrants of the map. Therefore, the TODs' sorting decisions were not

influenced by their familiarity with the storybooks.

During the procedure, we asked the TODs to sort the storybooks on the basis of how difficult they thought the books would be for Deaf preschoolers and kindergarteners to understand when the books were read aloud to them. We therefore treated these individual storybooks and groups of storybooks as separate ranks of difficulty in how TODs evaluated the 14 storybooks. The map's center (where the two axes cross) corresponds to component scores of zero. Items near (or at) the map's center do not help explain major patterns of similarity in the data.

To determine the four groups of storybooks, we examined the confidence interval ellipsoids and the quadrant on the map in which the storybooks were plotted. Group 1, shown in light gray, includes *Wemberly*, *Friends*, *Pigs*, *Wild*, *Dreams*, and *Frank*. Although *Dreams* and *Frank* are plotted in different quadrants on the map, the confidence interval ellipsoids for

**Figure 2.** Combined Two-Dimensional Map of How the TODs Collectively Sorted the Storybooks, With Storybooks (Dots) and 95% CIs



Component 1: Gradations of storybook difficulty explaining 59% of the variance

Notes. TOD = teacher of the deaf. See the text for an explanation of the grayscale color scheme.

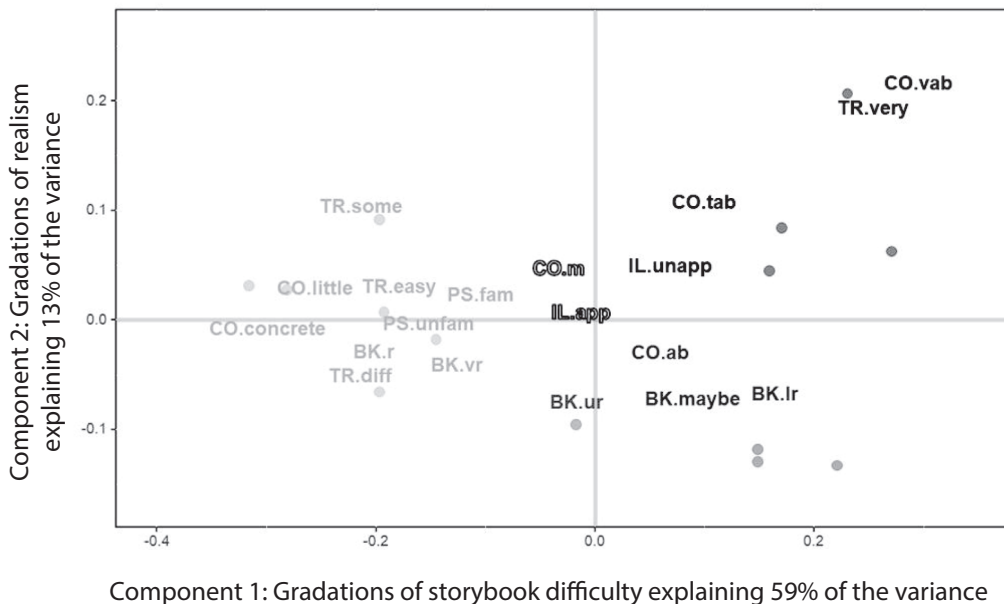
all six storybooks in this group are densely overlapping. For this reason, we ranked these storybooks as one category. Group 2, shown in dark gray, includes only *Dear* because the confidence interval ellipsoid for this storybook only sparsely overlaps with two books in different groups. Group 3, shown in grayish-black, includes *Piñata*, *Pablo*, and *Abuela*. Although the confidence interval ellipsoids of certain storybooks overlap to varying degrees with the storybooks shown in black, DiSTATIS plots only *Piñata*, *Pablo*, and *Abuela* in the lower right quadrant of the map, indicating that these storybooks were perceived as similar. For this reason, we ranked these storybooks as one category. The fourth category, shown in black, includes *Stone*, *Red*, *Duck*, and *June*. Although the confidence interval ellipsoids of certain storybooks overlap to varying degrees with those of the storybooks shown in grayish-black, DiSTATIS plots only *Stone*, *Red*, *Duck*, and *June* in the upper-right quadrant of the map, a configuration indicating

that these storybooks are similar. For this reason, we ranked these storybooks as one category. To understand the TODs' sorting behavior, we incorporated our two-tiered glossary into our DiSTATIS analysis.

DiSTATIS computed supplementary component scores for each qualifier associated with each book characteristic (e.g., IL [illustrations]: unappealing), then overlaid (i.e., projected) these scores onto the map of storybooks, as shown in Figure 3. The scores for each qualifier simply indicate which items the TODs frequently associated with particular storybooks and groups of storybooks. For a technical description of this procedure, see Appendix D in Abdi et al. (2015) or Lahne et al. (2018). In Figure 3, the book characteristic is in capital letters and precedes the qualifier (e.g., TR.easy = indicates storybooks that are easy to translate into ASL). See Table 4 for the abbreviation key.

The book characteristics and qualifiers are color-coded. The book characteristics and qualifiers in white with black outline

Figure 3. Combined Two-Dimensional Map of Storybooks and Book Characteristics With Qualifiers



Notes. See the text for an explanation of the grayscale color scheme.



plotted at the map's center in Figure 3 are not associated with one of the four storybook groups plotted in Figure 2, so these are not important in our analysis. The remaining book characteristics and qualifiers are grayscale color-coded on the basis of their proximity on the map to the four storybook groups plotted in Figure 2. TODs described books on the far left side of the horizontal axis shown in Figure 2 (a) as having concepts that were concrete to a little abstract, (b) as being either relatable or very relatable to the background knowledge of Deaf pre-readers, (c) as ranging from easy, to somewhat difficult, to difficult to translate into ASL, and (d) as having plots/sequences that were both familiar and unfamiliar to Deaf students. TODs described books on the far right side of the map (a) as having concepts ranging from very abstract to too abstract and (b) as being difficult to translate into ASL.

The second component (vertical axis) contrasts a storybook grounded in pure fantasy—*June*—with storybooks grounded in real life—*Dear, Pablo, Piñata*, and *Abuela*. The TODs associated the storybook *June*, plotted at the top of the map, with being very abstract and very difficult to translate into ASL. The TODs associated the four storybooks—*Dear, Pablo, Piñata*, and *Abuela*—at the bottom of the map with having abstract concepts and as being maybe relatable and less relatable to the background knowledge of Deaf pre-readers.

#### Fourth Question: What Are the Difficulty Levels and Exemplar Books for Each Level?

We used the four groups of storybooks identified in Figure 2 as the difficulty levels of our book selection system, shown as column headers in Table 5. Then we used

the grayscale color-coded book characteristics and qualifiers that were associated with each group of storybooks shown in Figure 3 to explain the characteristics of each level of the difficulty scale. The book characteristics are shown as row labels in Table 5, and the qualifiers are shown in the table cells. We identified the exemplar book for each difficulty level on the basis of which storybook had the median component score for that storybook group.

Three of the book characteristics/categories—*Background Knowledge*, *Translation*, and *Plot/Sequence*—do not have standardized qualifiers for each level of the book selection system. This happened because the two-tiered glossary (Table 4) is based on comments made by most TODs about most—but not all—of the storybooks. So, for Level 4—the most difficult level of our book selection system—TODs did not consider *Background Knowledge* and *Plot/Sequence* as defining categories, but did consider *Concept*, *Illustrations*, and *Translation* as defining categories. The *Translation* category is represented only at the extreme ends of the book selection difficulty scale, with three qualifiers in the easiest level and the *very difficult* qualifier in the most difficult level. This finding suggests that that there are differences in translation difficulty in the easiest level but not enough relative to the other book characteristics to create a separate difficulty level in the book selection system. The easiest level of our book selection system is also the only level to include *Plot/Sequence* and it includes both the *familiar* and *unfamiliar* qualifiers. In other words, TODs thought there were differences in the easiest level of books, but these differences were not important enough relative to the other book characteristics/categories to create a separate difficulty level in the book selection system.

**Table 5.** Book Selection System for TODs Serving Deaf Preschoolers and Kindergarteners Who Use ASL to Communicate

Scale and exemplar books	1 <i>Dreams</i>	2 <i>Dear Juno</i>	3 <i>Hooray, a Piñata!</i> <i>Pablo's Tree</i>	4 <i>Little Red Riding Hood</i>
Concept	Concrete, little abstract	More abstract	Abstract	Very abstract, too abstract
Background knowledge	Relatable, very relatable	Unrelatable	Maybe relatable, less relatable	
Illustrations	Appealing	Appealing	Appealing	Appealing, unappealing
Translation	Easy, somewhat difficult, difficult			Very difficult
Plot/sequence	Familiar, unfamiliar			
Other storybooks in each level	<i>Wemberly Worried</i> <i>Friends</i> <i>Three Little Pigs</i> <i>Where the Wild Things Are</i> <i>Franklin Has a Sleepover</i>		<i>Abuela's Weave</i>	<i>Stone Soup</i> <i>The Ugly Ducking</i>

Notes. TOD = teacher of the deaf. ASL = American Sign Language.

## DISCUSSION

Preschool teachers of hearing children (Damber, 2014), teachers of hearing elementary school teachers (McGee & Schickendanz, 2007), and TODs of Deaf children using ASL (Hayes & Shaw, 1994) have difficulty selecting appropriate books for read-alouds. One reason for this difficulty is that evidence-based book-sharing interventions that focus on developing language skills require books with a wide range of difficulty, from books used for labeling illustrations to books requiring inferences about cause-and-effect relationships in the plot. Our purpose was to identify the criteria TODs use to select storybooks for read-alouds with Deaf pre-readers receiving instruction primarily through ASL. We identified a

glossary of book characteristics and qualifiers from the TODs' descriptions of how they sorted the storybooks using content analysis. We used DiSTATIS to create a difficulty scale and exemplar books for each scale level. We also used DiSTATIS to overlay the glossary onto the book-sorting analysis to understand why the TODs sorted the storybooks as they did. From this analysis, we extracted a book selection system with a two-tiered glossary and a 4-point difficulty scale, and exemplar books for each scale level. Next, we discuss how our system compares to the Hayes and Shaw (1994) book selection system and the Schwarz et al. (2019) book selection system. Then we discuss how our system can be used with the levels of difficulty required by the evidence-based dialogic reading and literal and inferential

book-sharing interventions. Finally, we discuss the study's limitations and future research directions.

### How Our Results Compare to the Hayes and Shaw (1994) Book Selection System

Until the present study, the only book selection system designed for TODs serving ASL-using Deaf children was the Hayes and Shaw (1994) system. There are three major differences between our system and the Hayes and Shaw system. First, the Hayes and Shaw system focuses on book selection for children in preschool through third grade, while our system only focuses on preschoolers and kindergarteners. Second, five persons from one school created the Hayes and Shaw system, while 16 TODs from across the country created our system. Third, the Hayes and Shaw system was developed through consensus, while ours was created with a well-validated sorting task methodology from the taste and perception research (Chollet et al., 2011) adapted for creating book selection systems for different types of interventionists (Schwarz et al., 2015, 2019).

### How Our Results Compare to the Schwarz et al. (2019) Book Selection System

The Schwarz et al. (2019) book selection system is based on the judgments of TODs providing deaf and hard of hearing children instruction in English only. There are three major differences between the book selection system created by TODs using English only (Schwarz et al., 2019) and TODs using ASL (present study). First, most TODs using English only preferred 11 out of the 14 storybooks (Schwarz et al., 2019), while most TODs

using ASL preferred all 14 storybooks. Most TODs using English did not prefer *The Ugly Duckling*, *Abuela's Weave*, and *June 29, 1999*. Second, the two groups of TODs created different difficulty scales, with TODs using English collectively creating a 6-point difficulty scale (Schwarz et al., 2019) and TODs using ASL collectively creating a 4-point difficulty scale (present study). Third, a comparison of the results of the content analyses for each group captures important differences in perspective (see Tables 1 and 4). Both groups of TODs agreed that the familiarity of plot/sequence, the relatability of background knowledge, and the abstractness of concepts were important when selecting storybooks. Each group also identified different book characteristics and qualifiers. TODs using English thought that the complexity and predictability of the plot/sequence were important when selecting storybooks (Table 1). TODs using English also thought about the difficulty of vocabulary as well as the supportiveness, level of detail, and realism of the illustrations (Table 1). Although TODs using ASL also mentioned illustrations when selecting storybooks for read-alouds, they focused on how appealing they thought the illustrations would be to Deaf pre-readers. Another important difference is that the majority of TODs using ASL in the present study also thought about how difficult the storybooks would be to translate into ASL.

### How Our Book Selection System Might Help Teachers of the Deaf Select Books for Read-Alouds

The dialogic reading style (Zevenbergen & Whitehurst, 2003) and the literal-inferential reading style (van Kleeck et al., 2006) are the two evidence-based book sharing interventions focused on building

language skills that are compatible with the Framework of Early Literacy (Kuntze & Golos, 2021). TODs serving Deaf children should use the dialogic reading approach to develop children's use of ASL conversational vocabulary and grammar, just as it is used for children learning spoken languages or bimodal presentations of spoken languages (Dirks & Wauters, 2015, 2018; Fung et al., 2005; Huebner, 2006; Lederberg et al., 2014; Mol et al., 2008; Trussell & Easterbrooks, 2014; Zevenbergen & Whitehurst, 2003). Books that are appropriate to use with dialogic reading have illustrations that can tell the story and introduce new vocabulary (Whitehurst et al., 1994). We recommend that TODs select books from the first two levels of our book selection system when choosing books for dialogic reading. The books in the first two levels of our book selection system include books with concepts that are concrete and content that is very relatable to the store of background knowledge Deaf pre-readers likely possess. As the children acquire ASL vocabulary and grammar and can answer questions about information contained in the illustrations, we suggest continuing to use dialogic reading but with the one storybook in Level 2. Even though the book in Level 2 is harder than the books in Level 1, the illustrations still help to make accessible the somewhat abstract concepts and content that may be unrelatable to the background knowledge of some Deaf pre-readers.

Some TODs may be inclined to try to compare books they read aloud to Deaf pre-readers with the difficulty levels of our book selection system. Although we provide suggestions below for how TODs might approach this process, it is important for TODs to understand that this system has yet to be validated. When selecting books for dialogic reading using

our book selection system, we suggest that TODs compare books to the exemplar books (Level 1: *Dreams*, Level 2: *Dear Juno*) for each difficulty level and also ask themselves whether the illustrations depict important vocabulary and plot elements and how relatable the content is to the everyday lives of the children they teach. In addition to focusing on the illustrations to tell the story when translating books into ASL, TODs should repeat what the children say, expand their comments and questions into more sophisticated adult forms of ASL, and encourage the children to retell the story in ASL so that they fully acquire ASL and its storytelling conventions. Although the TODs in our study did not discuss potential bias or stereotypes when explaining their sorting decisions, a key component of the Framework of Early Literacy concerns facilitating identity development and understanding of self and others. For this reason, we suggest that TODs consider potential bias or stereotypes when selecting storybooks.

TODs serving Deaf children should use the literal-inferential read-aloud approach to promote both conversational language and academic language (van Kleeck, 2008, 2014; van Kleeck et al., 2006). Before implementing a literal-inferential read-aloud, TODs need to determine which literal and inferential questions are critical to the children's understanding of the story and its broader implications, and then balance those questions so that 60%–70% are literal questions and 30%–40% are inferential questions. We suggest writing those questions on a sticky note and placing them on the actual storybook page as a reminder to ask the questions.

We further suggest that TODs transition Deaf children from a dialogic reading approach to a literal-inferential approach using the one book in Level 2 as a starting

point. Once the children are successfully making inferences about information that is not depicted in the illustrations or ASL translation of the story, we suggest using books from Levels 3 and 4 in our system. TODs also need to verify the accuracy of their ASL translations when preparing books for read-alouds that fall in these two levels, given that the TODs in our study found these books more difficult to translate into ASL than books in Level 1. For TODs interested in trying to select storybooks that align with Levels 3 and 4 of our unvalidated system, we suggest that they ask themselves whether the children will have to make inferences and how many they will have to make to completely understand the story, and how many abstract concepts are contained in the story.

### Limitations of the Study

The present study had three potential limitations. First, we did not determine the ASL fluency level of TODs who participated in the study. When explaining how they sorted the storybooks, 85.71% of the TODs mentioned translation. We assume that the TODs' discussion of the *Translation* category describes their own view of translating the storybooks into ASL, not that of an educational interpreter, because the latter was never mentioned in our experimental procedure. Second, our book selection system has not been validated on a different set of storybooks. Third, we chose to use storybooks from several published preschool curricula adopted by large school districts and schools for the deaf across the country instead of simply using lists of favorite storybooks identified by Deaf storytellers and TODs serving Deaf children who communicate in ASL. We took this approach to ensure that we selected storybooks

with a range of difficulty levels extensive enough to maintain high expectations (e.g., Luckner, 2011).

### Suggestions for Future Studies


We imagine five sets of future research projects. First, we need to validate the present book selection system. To determine whether other people unfamiliar with how TODs serving Deaf pre-readers select storybooks, we plan to have out-of-field undergraduates and other professionals as well as parents use the book selection system to sort the same 14 storybooks used in the present study. Results from these studies will provide insight into how well the glossary of book characteristics and qualifiers enable these participants to approximate the judgments of the TODs who participated in our study. Second, we need to determine how selecting storybooks at the different levels of difficulty in our book selection system affects the quality of interactive communication between TODs and Deaf pre-readers. Such studies would be particularly important because we want Deaf pre-readers in bilingual/bicultural programs to acquire both conversational and academic registers in ASL. Without full acquisition of ASL, these students will be semilingual. Third, it would be interesting to compare the difficulty level and characteristics of books that TODs report reading aloud regularly with these attributes of the books used in the present study. Fourth, given that ease of translation into ASL was very much on the minds of the storytellers in the Hayes and Shaw (1994) study and in our study, a separate set of studies should be conducted on how Deaf storytellers and TODs translate storybooks into ASL. TODs and parents would greatly benefit from knowing at a microlevel how expert Deaf storytellers and TODs fluent in ASL

represent challenging parts of the stories in ASL. Finally, another set of studies with TODs fluent in ASL needs to be conducted to understand how their translations of storybooks change when they use a dialogic reading approach compared to a literal-inferential approach.

## CONCLUSION

Book selection for read-alouds is difficult for teachers of hearing students (Damber, 2014; McGee & Schickendanz, 2007) and Deaf students (Hayes & Shaw, 1994). The purpose of our pilot study was to create a book selection system for TODs to use with Deaf pre-readers. We created a book selection system that included a glossary of book characteristics and qualifiers, a 4-point difficulty level scale, and exemplar books for each scale level. Future studies will validate the system and determine how its use affects the interactive communication between TODs and Deaf pre-readers during the dialogic reading and literal-inferential approaches to book sharing. Preventing language deprivation is foundational to the Framework of Early Literacy (Kuntze & Golos, 2021). Using evidence-based read-aloud approaches designed to increase language skills is one important way TODs and parents can prevent language deprivation. Our suggestions for how to use the book selection system described here with the dialogic reading and literal-inferential read-aloud approaches are one step toward ensuring that Deaf children develop both the conversational and academic language registers of ASL.

## AUTHORS' NOTES

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## REFERENCES

- Abdi, H., & Valentin, D. (2007). Multiple correspondence analysis. In N. J. Salkind (Ed.), *Encyclopedia of measurement and statistics* (pp. 651–657). Sage.
- Abdi, H., Valentin, D., Chollet, S., & Chrea, C. (2007). Analyzing assessors and products in sorting tasks: DISTATIS, theory and applications. *Food Quality and Preference*, 18, 627–640. <https://doi.org/10.1016/j.foodqual.2006.09.003>
- Abdi, H., & Williams, L. J. (2010). Principal component analysis. *Wiley Interdisciplinary Reviews: Computational Statistics*, 2, 433–459. <https://doi.org/doi.org/10.1002/wics.101>
- Abdi, H., Williams, L. J., Valentin, D., & Bennani-Dosse, M. (2012). STATIS and DISTATIS: Optimum multi-table principal

- component analysis and three-way metric multidimensional scaling. *Wiley Interdisciplinary Reviews: Computational Statistics*, 4, 124–167. <https://doi.org/10.1002/wics.198>
- Akamatsu, C. T., & Andrews, J. F. (1993, Winter). It takes two to be literate: Literacy interactions between parent and child. *Sign Language Studies*, 81, 333–360. <https://psycnet.apa.org/doi/10.1353/sls.1993.0006>
- Anderson, J., Anderson, A., Shapiro, J., & Lynch, J. (2001). Fathers' and mothers' book selection preferences for their four-year-old children. *Reading Horizons*, 41, 189–211.
- Andrews, J. F. (2012). Reading to deaf children who sign: A response to Williams (2012) and suggestions for future research. *American Annals of the Deaf*, 157(3), 307–319. doi:10.1353/aad.2012.1622
- Andrews, J. F., & Taylor, N. E. (1987, Fall). From sign to print: A case study of picture book “reading” between mother and child. *Sign Language Studies*, 56, 261–274.
- Andrews, J. F., & Zmijewski, G. (1997). How parents support home literacy with deaf children. *Early Child Development and Care*, 127, 131–139. <https://doi.org/10.1080/0300443971270111>
- Beck, I. L., & McKeown, M. G. (2001). Text Talk: Capturing the benefits of read-aloud experiences for young children. *The Reading Teacher*, 55(1), 10–20.
- Berke, M. (2013). Reading books with young deaf children: Strategies for mediating between American Sign Language and English. *Journal of Deaf Studies and Deaf Education*, 18, 299–311. <https://doi.org/10.1093/deafed/ent001>
- Blancher, G., Chollet, S., Kesteloot, R., Nguyen Hoang, D., Cuvelier, G., & Sieffermann, J. M. (2007). French and Vietnamese: How do they describe texture characteristics of the same food? A case study with jellies. *Food Quality and Preference*, 18, 560–575.
- Bradley, B. A., & Jones, J. (2007). Sharing alphabet books in early childhood classrooms. *The Reading Teacher*, 60(5), 452–463. <https://doi.org/10.1598/RT.60.5.5>
- Chall, J. S., Bissex, G. L., Conrad, S. S., & Harris-Sharples, S. (1996). *Qualitative assessment of text difficulty: A practical guide for teachers and writers*. Brookline Books.
- Chollet, S., Lelièvre, M., Abdi, H., & Valentin, D. (2011). Sort and beer: Everything you wanted to know about the sorting task but did not dare to ask. *Food Quality and Preference*, 22, 507–520. <https://doi.org/10.1016/j.foodqual.2011.02.004>
- Damber, U. (2014). Read-alouds in preschool—A matter of discipline? *Journal of Early Childhood Literacy*, 15(2), 1–25. <https://doi.org/10.1177/1468798414522823>
- Delk, L., & Weidekamp, L. (2001). *Shared Reading Project: Evaluating implementation processes and family outcomes*. Laurent Clerck National Deaf Education Center. <https://files.eric.ed.gov/fulltext/ED453519.pdf>
- Dirks, E., & Wauters, L. (2015). Enhancing emergent literacy in preschool deaf and hard-of-hearing children through interactive reading. In H. Knoors & M. Marschark (Eds.), *Educating deaf learners: Creating a global evidence base* (pp. 415–441). Oxford University Press.
- Dirks, E., & Wauters, L. (2018). It takes two to read: Interactive reading with young deaf and hard-of-hearing children. *Journal of Deaf Studies and Deaf Education*, 23, 261–270. <https://doi.org/10.1093/deafed/eny005>
- Elster, C. A. (1998). Influences of text and pictures on shared and emergent readings. *Research in the Teaching of English*, 32, 43–78.
- Erting, C. J., & Pfau, J. (1997). *Becoming bilingual: Facilitating English literacy development using ASL in preschool*. U.S. Department of Education
- Fung, P., Chow, B., & McBride-Chang, C. (2005). The impact of a dialogic reading program on deaf and heard-of-hearing kindergarten and early primary school-aged students in Hong Kong. *Journal of Deaf Studies and Deaf Education*, 10, 83–95.
- Gallaudet Research Institute. (2013). *Regional and national summary report of data from the 2011–12 Annual Survey of Deaf and Hard of Hearing Children and Youth*.
- Gioia, B. (2001). The emergent language and literacy experiences of three deaf preschoolers. *International Journal of Disability*, 48, 411–428.
- Golos, D. (2010a). Deaf children's engagement in an educational video in American Sign Language. *American Annals of the Deaf*, 155(3), 360–368.
- Golos, D. (2010b, Fall). Literacy behaviors of deaf preschoolers during video viewing. *Sign Language Studies*, 11, 76–99. <https://doi.org/10.1353/sls.2010.0001>
- Golos, D. B., & Moses, A. M. (2013). Developing preschool deaf children's language and literacy learning from an educational media series. *American Annals of the Deaf*, 158(4), 411–425. <https://doi.org/10.1353/aad.2013.0039>
- Griffin, L. (1970). *Books in preschool: A guide to selecting, purchasing, and using children's books*. National Center for Educational Research and Development.

- Hayes, P. L., & Shaw, P. C. (1994). Guidelines for selecting read-aloud books for deaf children as suggested by storytellers using American Sign Language. In M. P. Moeller & B. Schick (Eds.), *Deafness and diversity: Sociolinguistic issues* (pp. 29–37). Boys Town National Research Hospital.
- Huebner, C. (2006). Optimizing the effects of shared reading on early language skills. In A. van Kleeck (Ed.), *Sharing books and stories to promote language and literacy* (pp. 149–178). Plural Publishing.
- Kuntze, M., & Golos, D. (2021). Revisiting rethinking literacy. In C. Enns, J. Henner, & L. McQuarrie (Eds.), *Discussing bilingualism in deaf children* (pp. 99–112). Routledge.
- Lahne, J., Abdi, H., & Heymann, H. (2018). Rapid sensory profiles with DISTATIS and Barycentric Text Projection: An example with *amari*, bitter herbal liqueurs. *Food Quality and Preference*, 66, 36–43. <https://doi.org/10.1016/j.foodqual.2018.01.003>
- Lartz, M., & Lestina, L. J. (1995). Strategies deaf mothers use when reading to their young deaf or hard of hearing children. *American Annals of the Deaf*, 140(4), 358–362. <https://doi.org/10.1353/aad.2012.0358>
- Laurent Clerc National Deaf Education Center. (2015). *Schools and programs for deaf and hard of hearing students in the U.S.* <https://clerccenter.gallaudet.edu/national-resources/info/info-to-go/national-resources-and-directories/schools-and-programs.html>
- Lederberg, A. R., Miller, E. M., Easterbrooks, S. R., & McDonald Connor, C. (2014). Foundations for literacy: An early literacy intervention for deaf and hard-of-hearing children. *Journal of Deaf Studies and Deaf Education*, 19, 438–455.
- Luckner, J. (2011). Promoting resilience: Suggestions for families, professionals, and students. In D. H. Zand & K. J. Pierce (Eds.), *Resilience in deaf children: Adaptation through emerging adulthood* (pp. 207–226). Springer Science+Business Media.
- Lynch-Brown, C., & Tomlinson, C. M. (2008). *Essentials of children's literature* (6th ed.). Allyn & Bacon.
- Martinez, M., & Roser, N. (1985). Read it again: The value of repeated readings during storytime. *The Reading Teacher*, 38(8), 782–786. [www.jstor.org/stable/20198926](http://www.jstor.org/stable/20198926)
- Mayberry, R. I., Lock, E., & Kazmi, H. (2002). Linguistic ability and early language exposure. *Nature*, 417(6884), 38. <https://doi.org/10.1038/417038a>
- McGee, L. M., & Schickendanz, J. A. (2007). Repeated interactive read-alouds in preschool and kindergarten. *The Reading Teacher*, 60(8), 742–751. <https://doi.org/10.1598/RT.60.8.4>
- MetaMetrics. (2014). *Text complexity grade bands and lexile bands*. <https://lexile.com/using-lexile/lexile-measures-and-the-ccssi/text-complexity-grade-bandsand-lexile-ranges/>
- Mol, S. E., Bus, A. G., de Jong, M. T., & Smeets, D. J. H. (2008). Added value of dialogic parent-child book readings: A meta-analysis. *Early Education and Development*, 19, 7–26. <https://doi.org/10.1080/10409280701838603>
- Mueller, V., & Hurtig, R. (2010). Technology-enhanced shared reading with deaf and hard-of-hearing children: The role of a fluent signing narrator. *Journal of Deaf Studies and Deaf Education*, 15, 72–101. <https://doi.org/10.1093/deafed/enp023>
- National Governors Association Center for Best Practices & Council of Chief State School Officers. (2012). *Common core state standards for English language arts & literacy in history/social studies, science, and technical subjects*.
- Nolin, J. (2014, September). The 2014 AS&U 100. *American School and University*. <https://www.asumag.com/research/article/20851971/the-2014-asu-100>
- Nover, S. M., & Andrews, J. F. (1999). *Critical pedagogy in deaf education: Bilingual methodology and staff development* (USDLC Star Schools Project Report No. 2. Year Two, 1998–1999). New Mexico School for the Deaf. <https://files.eric.ed.gov/fulltext/ED438634.pdf>
- Patris, B., Gufoni, V., Chollet, S., & Valentin, D. (2007, July). *Impact of training on strategies to realize a beer sorting task: Behavioral and verbal assessments* [Paper presentation]. Summer Program in Sensory Evaluation, Ho Chi Minh City, Vietnam.
- Radford, J., & Noe-Bustamante, L. (2019). *Facts on U.S. immigrants, 2017: Statistical portrait of the foreign-born population in the United States*. Pew Research Center. <https://www.pewresearch.org/hispanic/2019/06/03/facts-on-u-s-immigrants-2017-data/>
- Santosa, M., Abdi, H., & Guinard, J. X. (2010). A modified sorting task to investigate consumer perceptions of extra virgin olive oils. *Food Quality and Preference*, 21, 881–892.
- Schleper, D. R. (1995a). Reading to deaf children: Learning from deaf adults. *Perspectives in Education and Deafness*, 13(4), 4–9.



- Schleper, D. R. (1995b). Read it again and again... and again. *Perspectives in Education and Deafness*, 14(2), 16–19.
- Schreier, M. (2012a). Building a coding frame. In *Qualitative content analysis in practice* (pp. 80–106). Sage.
- Schreier, M. (2012b). Strategies for building a data-driven coding frame. In *Qualitative content analysis in practice* (pp. 107–125). Sage.
- Schreier, M. (2012c). Trying it out: The pilot phase. In *Qualitative content analysis in practice* (pp. 146–165). Sage.
- Schwarz, A. L., Guajardo, J., & Hart, R. (2018). How do communication modes of d/Deaf and hard-of-hearing prereaders influence teachers' read-aloud goals? *Deafness and Education International*, 19(3–4), 115–125. <https://doi.org/10.1080/14643154.2017.1392768>
- Schwarz, A. L., Jurica, M., Matson, C., Webb-Culver, T., & Abdi, H. (2019). Storybook selection criteria used by teachers of d/Deaf and hard of hearing prereaders communicating in English. *Deafness and Education International*, 21, 1–36.
- Schwarz, A. L., van Kleeck, A., Beaton, D., Horne, E., MacKenzie, H., & Abdi, H. (2015). A read-aloud storybook selection system for prereaders at the preschool language level: A pilot study. *Journal of Speech, Language, and Hearing Research*, 58, 1273–1291. [https://doi.org/10.1044/2015\\_JSLHR-L-15-0056](https://doi.org/10.1044/2015_JSLHR-L-15-0056)
- Stewart, D., Bennett, D., & Bonkowski, N. (1992). Books to read, books to sign. *Perspectives in Education and Deafness*, 10(1), 4–7.
- Stewart, D., Bonkowski, N., & Bennett, D. (1990). *Considerations and implications when reading stories to young deaf children*. Michigan State University, College of Education, Institute for Research and Teaching.
- Swanwick, R. (2016). Deaf children's bimodal bilingualism and education. *Language Teaching*, 49(1), 1–34. <https://doi.org/10.1017/S0261444815000348>
- Swanwick, R., & Watson, L. (2007). Parents sharing books with young deaf children in spoken English and BSL: The common and diverse features of different language settings. *Journal of Deaf Studies and Deaf Education*, 12, 385–405. <https://doi.org/10.1093/deafed/enm004>
- Tang, C., & Heymann, H. (2002). Multidimensional sorting, similarity scaling and free-choice profiling of grape jellies. *Journal of Sensory Studies*, 17, 493–509.
- Trussell, J. W., & Easterbrooks, S. R. (2014). The effect of enhanced storybook interaction on signing deaf children's vocabulary. *Journal of Deaf Studies and Deaf Education*, 19, 319–332. <https://doi.org/10.1093/deafed/ent055>
- Ukrainetz, T. A., Cooney, M. H., Dyer, S. K., Kysar, A. J., & Harris, T. J. (2000). An investigation into teaching phonemic awareness through shared reading and writing. *Early Childhood Research Quarterly*, 15, 331–355.
- Van Kleeck, A. (2008). Providing preschool foundations for later reading comprehension: The importance of an idea for targeting inferencing in storybook-sharing interventions. *Psychology in the Schools*, 45, 627–643. <https://doi.org/10.1002/pits.20314>
- Van Kleeck, A. (2014). Distinguishing between casual talk and academic talk beginning in the preschool years: An important consideration for speech-language pathologists. *American Journal of Speech-Language Pathology*, 23, 724–741. [https://doi.org/10.1044/2014\\_AJSLP-14-0032](https://doi.org/10.1044/2014_AJSLP-14-0032)
- Van Kleeck, A., Vander Woude, J., & Hammett, L. (2006). Fostering literal and inferential language skills in Head Start preschoolers with language impairment using scripted book-sharing discussions. *American Journal of Speech-Language Pathology*, 15, 85–95.
- Watson, L., & Swanwick, R. (2008). Parents' and teachers' views on deaf children's literacy at home: Do they agree? *Deafness and Education International*, 10, 22–39. <https://doi.org/10.1002/dei.235>
- Weber, R. P. (1990). *Basic content analysis* (2nd ed.). Sage.
- Whitehurst, G. J., Epstein, J. N., Angell, A. L., Payne, A. C., Crone, D. A., & Fischel, J. E. (1994). Outcomes of an emergent literacy intervention in Head Start. *Journal of Educational Psychology*, 86, 542–555.
- Williams, C. L. (2012). Promoting vocabulary learning in young children who are d/Deaf and hard of hearing: Translating research into practice. *American Annals of the Deaf*, 156(5), 501–508. doi:10.1353/aad.2012.1597
- Zevenbergen, A. A., & Whitehurst, G. J. (2003). Dialogic reading: A shared picture book reading. In A. van Kleeck, S. A. Stahl, & E. B. Bauer (Eds.), *On reading books to children: Parents and teachers* (pp. 177–200). Routledge.
- Zucker, T. A., Ward, A. E., & Justice, L. M. (2009). Print referencing during read alouds: A technique for increasing emergent readers' print knowledge. *The Reading Teacher*, 63(1), 62–72. <https://doi.org/10.1598/RT.63.1.6>