Visual attention management during book reading activities with deaf and hard of hearing students

Abstract
Word Count: 120

This study examines how teachers socialize student engagement and participation in deaf and hard-of-hearing (DHH) classrooms. We compare teacher-student interactions during group book-sharing in ASL-signing classrooms and spoken English classrooms, describing teachers' language use and visually anchored socializing practices. While total proportion of teacher talk was the same, ASL teachers had fewer turns that lasted longer than Sp-English teachers. ASL teachers used a variety of visually anchored practices (e.g., waving) and linguistically encoded cues to guide student attention; Sp-English teachers used a reduced set of visual practices but they were more frequent, as were linguistic cues to participation. Our findings consider the demands and affordances of book-sharing using a visual language and being a DHH learner in this instructional context.

Proposal
Word Count: 1,997

Objectives/Purpose
For deaf[1] and hard of hearing (DHH) children who sign, the experience of classroom learning through a visual language requires developing a set of looking practices that accommodate multiple visual sources of information (Dye et al., 2008; Mather & Clark, 2012). For example, in a teacher-led group instruction book-sharing context, a deaf child needs to alternately look at the book, the signing teacher, and other classmates. In this study we ask how student participation practices are socialized by teachers in group instruction contexts in signing classrooms with DHH students. We compare video-recorded teacher-student interactions in early elementary classrooms with DHH students taught using American Sign Language (ASL) (N=2) to classrooms where teachers use spoken English (Sp-English) (N=2) with their DHH students. We explore socializing practices unique to signing classrooms and visually anchored practices

[1] We use "deaf" to refer to children with a range of hearing thresholds and speaking or signing preferences. In some research on DHH students, it has been common practice to capitalize the word "Deaf" when referring to members of the deaf signing community, this practice has been debated in more recent work (Kusters et al., 2017; Pudans-Smith, et al., 2019).

common to classrooms with DHH students regardless of the language of instruction (ASL vs. Sp-English). In this study we report two analyses. In the first analysis, we characterize the dynamics of teacher-student interaction during group book-sharing instruction (e.g., the amount of teacher talk and the length of conversational turns). In the second analysis, we describe teachers' language use and an inventory of visually anchored socializing practices that promote DHH students' appropriate visual attention and classroom discourse participation.

Perspectives/Theoretical Framework

This study is grounded in a language socialization and developmental framework, building on prior work that explored the visually orienting practices and indigenous visual behaviors used by deaf teachers (Crume & Singleton, 2008; Graham, 2015; Singleton & Morgan, 2006). For example, deaf teachers use a variety of non-auditory practices to provide socializing cues to students about participation, including specific gaze patterns to prompt individual or group participation (Mather 1987, 1989; Mather & Thibeault, 2000) and tactile or vibratory attention management strategies (DeLuzio & Girolametto, 2006). These classroom practices resemble practices in families where both caregiver and child are deaf and use ASL. In these interactions, caregivers adapt their signing to the child and use tactile and haptic practices to guide the child's visual attention (Harris & Mohay, 1997; Koester et al., 1998; Waxman & Spencer, 1997).

To describe the pedagogical styles we observed, we employ a framework termed "learning by instruction and pitching in," or LOPI, proposed by Rogoff et al. (2015). Rogoff et al.'s theory contrasts two ways of thinking about children's learning. The first set of practices, "Assembly-Line Instruction," is characterized by adult control of children's attention with transmission and receipt of information as the goal of learning. The second set of practices,

LOPI, are characterized by the incorporation of children into community endeavors, the belief that children learn through experience, and that they depend on wide attention and observation of events to become active, contributing members of the community.

The majority of deaf children are born to hearing families (Mitchell & Karchmer, 2004) and may be at risk of language delays if their home context does not offer accessible linguistic input (Lederberg, et al, 2013). Because of these circumstances, school is often an essential site for the development of linguistic and social skills (Lieberman et al., 2014; Lieberman, 2015; Singleton & Morgan, 2005). This study describes practices that are in place in ASL and spoken-English classrooms with the aim of understanding how teachers are adapting their instruction to facilitate visual access and socialization. We provide a descriptive inventory of the practices and linguistic cues that teachers are using and consider similarities and differences across the classroom types.

Data Source

The video data for this study are part of a dataset collected by the Center on Literacy and Deafness (CLAD) (Duncan & Lederberg, 2018; Easterbrooks et al., 2010; Lederberg, et al., 2019). Researchers sampled early elementary classrooms (Kindergarten, First Grade, or Second Grade) that used ASL, spoken English, or a combination of signing and speaking. Students and teachers were filmed during Language Arts instruction and were evaluated using a variety of literacy measures. We use a subset of these video recordings that includes four classrooms—two classrooms taught in ASL and two classrooms taught in spoken English. We selected five-minute clips of teachers reading aloud from a book to a group of three or more students. The book-

reading activities were teacher-led but included student participation. Classroom characteristics are summarized in Table 1.

Methods

We developed a coding system to analyze the classroom video dataset that included three categories: teacher conversational turn, visual attention practices, and deictic gesture target. Intercoder reliability was 84% for teacher conversational turns, 84% for teacher visual attention practices, and 99% for deictic gesture targets. Teacher conversational turns were based on when teachers started and stopped signing or speaking. Short pauses in teacher signing/speaking in which there were no student interruptions were not counted as a break in teacher turn. In the ASL classrooms, visually anchored attention practices included deictics, waves, extended signs (ASL signs that were prosodically emphasized because they were held longer than typical conversational pronunciation), knocks (on the floor or table), and taps (on or near students' bodies). We also coded explicit linguistic encoding of attention comments and directives, including instructions to look at or watch the teacher, turn initiations with signs like "HEY!" and "READY?" as well as prohibitions to participation with signs including "HOLD-ON" or "WAIT".

We next asked whether the visually anchored socializing practices and explicit attention language observed in the ASL classrooms were present in the Sp-English classrooms and explored whether there were different practices in the Sp-English classrooms that we had not observed in the ASL classrooms. For visual attention practices, we added codes for other types of co-speech gestures used by English-speaking teachers. Other gestures included iconic or pantomimic gestures like a demonstration of raising a hand while instructing students to raise

their hands. Teachers also used conventional gestures, including common emblems like raising one finger to their lips while saying “quiet” or “shh”.

Results

We start by describing the distribution of teacher turns for each classroom. We find that teacher turns took up a similar proportion of the total observed time in all four classrooms (approximately 70%). However, ASL teachers had fewer conversational turns (17-30 turns) that lasted longer while English-speaking teachers had more conversational turns (41-45 turns) that were shorter in duration. These results are presented in Table 2.

We then analyze the frequency of teachers’ use of visually anchored attention practices and attention language in the two classroom types. Teachers from Sp-English classrooms had more turns that co-occurred with one or more visual practices (66%-72% of turns) than ASL teachers (41%-50%). Sp-English teachers also had more turns that included attention language (38%-46% of turns) than ASL teachers (20-23%). These results are presented in Table 3.

In the final analysis, we present the distribution of different types of visually anchored attention practices in ASL and Sp-English classrooms. The number of times teachers in each classroom used different practices are presented in Figure 1. ASL teachers used a variety of strategies that English-speaking teachers never used, including waves, taps, knocks, and held signs; however, English-speaking teachers used more deictic gestures than ASL teachers.

In order to better understand the function of deictic gestures in the two types of classrooms, we coded the target of each deictic gesture. Deictic gestures could point towards a student or multiple students, towards the book the teacher was reading, or to another target in the classroom. Table 4 shows point targets as a proportion of all points.

Three of the teachers in the sample used deictics and all frequently directed students' attention to the book they were reading. The ASL teachers in this sample did not frequently point to students, using other strategies like eye gaze to indicate permission for a turn or inhibiting student turns. In the first ASL classroom, the teacher did not use deictic gestures as a practice for managing student turns or indicating the book she was reading, instead incorporating exaggerated prosody and subtle gaze cues to encourage or discourage student participation. Both ASL teachers used waves and haptic practices to get students' attention at the beginning of turns. In the sp-English classrooms teachers frequently pointed to students, either to indicate that a student had permission to start a turn or to point to a student while they took a turn.

Our findings reflect the fact that in the ASL classrooms in our sample, teachers used subtle practices for managing visual attention and participation. They allowed many students to respond to the book, either individually or in overlapping turns. Students were not restricted to alternating turns, and teachers did not focus on students seeing or responding to other student's contributions. The practices used by ASL teachers may reflect the fact that from a teacher's vantage point they can see (and comprehend) multiple students' concurrent responses. Teachers' longer conversational turns in ASL classrooms may also create an implicit expectation for students to stay visually focused on the teacher. This practice could contribute to a more natural evolution of self-socialization of turn-taking practices wherein students build up their "noticing" of who is signing (i.e., who has the floor) through daily observational experiences, similar to LOPI styles of teaching and learning (Rogoff, 2015).

During shared book-reading activities in the Sp-English classrooms in our sample, teachers actively managed student attention and participation through both visually anchored practices and explicitly in their speech. Teachers often included explicit instructions to students

to "look" or "listen" and regulated turns so that only one student spoke at a time. Teachers in the spoken English classrooms are likely aware that their students have degraded auditory input and need more time to process that input. This may lead them to use shorter conversational turns and add visual cueing to support comprehension. For DHH students in spoken English classrooms, the processing of their peers' language is likely to be especially difficult if students all speak at the same time. Recognizing this, teachers may be strongly socializing defined turn-taking to support clear listening skills.

Significance

As DHH children "learn where to look" in classroom settings we have observed that there may be several approaches. ASL-using teachers are "inherently visual" and a student could develop effective looking practices either through direct socialization with explicit cueing from the teacher or through what may be considered self-socialization by learning through observation and direct experience (e.g., Rogoff's LOPI model), or a combination of the two. In the two spoken English classrooms we analyzed, DHH children are being socialized to listen; however, teachers liberally gestured to support students' listening comprehension with visual cues. They also created highly structured discourse practices, with short teacher turns and clear cueing of who has the floor. This turn-taking pattern gives students more frequent pauses to process speech from their peers or the teacher.

Lastly, we consider the possibility that some of the differences in the two types of classrooms (ASL vs. Sp-English) can be partly attributed to different teacher objectives for the book-reading activity. Some of the practices observed in the ASL classrooms resemble those promoted in "shared book-reading," a method for reading books together with children using ASL (Berke, 2013; Schleper, 1997). This method emphasizes the creative and storytelling

affordances of ASL. In the spoken English classrooms, teachers are using more of a dialogic approach to reading, alternating reading aloud with questions about the text, a method shown to support DHH students' early literacy (Fung et al., 2005; Lederberg et al., 2014). In future analyses, we will consider the role of activity type in the practices documented in the current study, extending the analysis to classroom settings with different conversational demands. We are interested in whether these contexts may prompt more explicit conversational turn guidance from an ASL-using teacher.

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Tables

Table 1. Classroom characteristics

Classroom Type	Language of Instruction	Grade Levels	Number of Students
DHH only	ASL	K	5
DHH only	ASL	1	6
DHH only	Sp-English	K-1	3
DHH only	Sp-English	1	5

Table 2. Teacher conversation turns

Class Type	Number of Turns	Mean Turn Length (sec)	Proportion of Total Time
ASL	17	12.3	0.70
ASL	30	7.0	0.70
Sp-English	45	4.5	0.71
Sp-English	41	4.7	0.69

Table 3. Proportion of teacher turns that co-occur with one or more visually-anchored attention practices and proportion of turns that include explicit attention language

Class Type	Proportion with visual practices (N turns)	Proportion with attention language (N turns)
ASL	0.41 (7)	0.23 (4)
ASL	0.50 (15)	0.20 (6)
Sp-English	0.72 (34)	0.46 (20)
Sp-English	0.66 (29)	0.38 (18)

Table 4. Deictic gesture targets in ASL and Sp-English Classrooms

Class Type	Points to students (N points)	Points to the book (N points)	Points to other targets (N points)
ASL	0 (0)	0 (0)	0 (0)
ASL	0.09 (2)	0.81 (18)	0.09 (2)
Sp-English	0.31 (14)	0.67 (30)	0.02 (1)
Sp-English	0.46 (19)	0.44 (18)	0.09 (4)

Figures

Figure 1. Visually-anchored attention practices in ASL and Sp-English Classrooms