# The Socialization of Visual Engagement in Deaf Preschoolers

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**Abstract**

This qualitative study examines classroom interaction between 2 deaf teachers and 6 deaf preschoolers in two book-sharing contexts. Teacher's attention-getting actions directed toward the children and discourse-embedded cues that signal teacher's expectations for student participation were documented. Teacher behaviors differed according to the parent status of the deaf preschooler (Deaf parents vs. Hearing parents) suggesting that deaf children of deaf parents arrive to the classroom with a well-developed self-regulation of their attention. We observed that teachers used specific interaction strategies with deaf children of hearing parents -- possibly to promote their development of visual engagement and to help increase their successful participation in this visual language community. We situate these socialization patterns within a framework that integrates notions of *indigenous practices* (Humphries, 2004), *developmental niche* (Super & Harkness, 2003) and *modality capital*. Implications for early childhood education are also discussed.

## Introduction

Initially, a newborn engages in mutual gaze with their caregiver because their limited eyesight prevents them from seeing clearly anything much farther away than their caregiver's face. To be sure, many studies have confirmed that infants are fascinated by faces (Bahrick & Lickliter, 2002; Johnson, Dziurawiec, Bartrip, & Morton, 1992; Meltzoff & Moore, 1977), yet it is not until after 3 to 4 months of age that we see a developmental shift characterized by improved cortical control of eye movements and an increasingly volitional capacity to disengage attention and shift attention (Vaughan van Hecke & Mundy, 2007). Through the first six months of life, gaze-following begins to emerge, in that an infant begins to follow her caregiver's direction of gaze and jointly attends to interesting objects or people in the world (Adamson & Bakeman, 1991). Studies evaluating infant's gazing or attending have deployed a fairly wide range of behavioral measures (e.g., head-turning, looking time) and experimental instruments (e.g., eye tracking, EEG). Through these multiple methods, researchers have mapped out a reasonable developmental trajectory of visual engagement, at differing grains of analysis, among children who both hear and see (Ruff & Rothbart, 1996).

The infant's capacity to follow the joint attention bids of others (e.g., gaze shift, pointing, and vocalizing) is called "Responding to Joint Attention" or RJA (Butterworth & Jarrett, 1991; Mundy, 2003; Scaife & Bruner, 1975). Joint Attention is viewed by many developmental researchers to be a key psychological process, and is argued to be critical for developing basic socio-cognitive understanding and language (Baldwin, 1995; Bornstein, 1990; Brooks & Meltzoff, 2002, 2005, 2008; Mundy, 2003; Tomasello, 1995, 1999; Tomasello & Farrar, 1986). An infant first "learns to" gaze-follow, and then "learns from" gaze-following as the social-cognitive component becomes better established (Vaughan van Hecke & Mundy, 2007, p. 40).

The capacity to self-regulate one's own visual attention also serves as one of the earliest components of the Executive Functions to come "online" (Anderson, 2002). According to Posner & Rothbart (2000, 2007), there are three stages of orienting attention. First, an individual must disengage from what they are presently looking at, then they must shift their attention to the new location, and finally they engage their attention to the new target. Researchers have described both exogenous (e.g., a caregiver's voice, a loud noise, or a flashing light) and endogenous factors (e.g., self-interest in a toy) that contribute to the process of orienting our attention. It is important to recognize that a child's developing capacity to engage in joint attention is shaped by both maturation and environmental/interactional processes (Mundy & Sheinkopf, 1998; Posner & Rothbart, 2000; Rothbart, Posner, & Boylan, 1990; Ruff & Rothbart, 1996).

**The Role of Maturation**

In the first year of life, there is significant maturation of the visual system and aspects of executive functioning. The visual system reaches adult levels for the most part at around 6 to 7 months of age (Aslin, 1987). The frontal cortex shows increased metabolic activity at about the 8$^{th}$ month and reaching a maximum between 12 and 24 months. There is evidence of a long period of plasticity for the frontal areas of the brain with high activity until about age 7, followed by a decline to adult levels around the age of 16 (Huttonlocher, 2002). While a 9-12 month old child shows the emergence of rudimentary elements of executive control (Ruff & Rothbart, 1996), the period between 12 and 36 months marks a significant advance in the child's self-regulatory abilities (Bronson, 2000). One might also ask whether precociousness might be observed in the development of attention mechanisms. Hypothetically, pre-term infants should have more extra-uterine "seeing" time and one might predict that components of visual

engagement such as attention and self-regulation would thus be accelerated in development; however, studies have shown that while some skills may appear earlier, they are still "less-mature" in these early stages and are not predictive of other developmental outcomes, suggesting a strong maturational influence (Van de Weijer-Bergsma, Wijnroks, & Jongsman, 2008).

**Atypical Development of Gaze Following**

Significantly, eye gaze serves as an important window into cognitive functioning. For example, children who are later diagnosed with autism spectrum disorder are found as young children to exhibit atypical gaze behaviors (Adamson, Bakeman, Deckner, & Romski, 2009; Baron-Cohen, 2000; Dawson, Meltzoff, Osterling, Rinaldi & Brown, 1998; Klin, Lin, Gorrindo, Ramsey & Jones, 2009; Mundy, Sigman, & Kasari, 2000). Children with Down Syndrome are slower to hit developmental milestones in gaze following (Adamson et al., 2009). Children with Attention Deficit Disorder also show atypical patterns of development of attention/gaze (see Ruff & Rothbart, 1996, for review). In typically developing children under the age of one, Responding to Joint Attention or following an adult's shift in gaze, appears to be a significant correlate of early vocabulary acquisition (Carpenter, Nagell, & Tomasello, 1998; Meltzoff & Brooks, 2008; Morales et al., 2000; Mundy, Kasari, Sigman, & Ruskin, 1995).

For the purposes of this study, however, we focus less on the infant's development of gaze following; rather, we examine the *socialization of gaze following*. That is, how do adults in the child's environment gain and direct a child's attention and how does that process interact with a child's developing capacity to regulate their own attentional processes? We shall focus on a specific context that is particularly demanding in terms of how the environment (i.e., the sociolinguistic rules of the language) requires the interlocutors (adult and child) to use sophisticated, rapid, and meaning-infused regulation of visual attention. As will be further

detailed below, this study investigates how deaf adults interact with deaf children, communicating together through a natural signed language.

**The Socialization of Visual Engagement**

When a caregiver initiates a bid for joint attention, they elicit the child's attention, gaze toward a target object, and perhaps point, while simultaneously providing language to connect to meaning. Caregivers help infants understand what is of cultural importance in their social world and help them orient their attention, acquire new knowledge, and the associated word meanings. What is important to remember about this process is that for hearing children, they can visually explore the object of interest while simultaneously hearing the linguistic input provided by their caregiver. Nevertheless, cross-cultural studies reveal some variation in how caregivers socialize their children's attention. Some caregivers are more directive, while others let their children discover their interests and self-orient (Bakeman, Adamson, Konner, & Barr, 1990; Chavajay & Rogoff, 1999; Rogoff, Mistry, Göncü, & Mosier, 1993).

Regardless of the extent of parent scaffolding, a child's attention will eventually shift from adult-supported to self-regulated (Bronson, 2000). Higher-level cognitive controls are now developing into a functional self-regulatory mechanism that affects many aspects of development. Into the preschool years, the child continues to consolidate her attention skills and gradually accumulates knowledge and language. New demands on the child's behavior (e.g., sitting still in a preschool class) require increases in inhibitory control, sustained attention, and shifts in attention (Ruff & Rothbart, 1996).

**Theoretical Framework for Socializing Gaze/Attention**

As we explore further how adults socialize children's attention, or gaze-following, we shall first outline some theoretical orientations that frame our interpretation of this

developmental process. First, we look at the social engagement behaviors initiated by adults and directed toward children as part of a larger system of parenting beliefs and practices, communication, and socio-cultural interaction patterns within a community. Caregivers possess certain indigenous knowledge systems or intuitive parenting practices (Papousek & Papousek, 1987), use culturally relevant artifacts, and hold certain beliefs about children's capacities, all of which form what Super and Harkness (1986, 2002) call a *developmental niche*. Within this niche, caregivers guide their children, scaffolding their behaviors, and support their development as full, legitimate participants in a *community of practice* (Chavajay & Rogoff, 1999; Lave & Wenger, 1991; Rogoff, 1990, 2003; Rogoff et al., 1993; Wenger, 1998).

Beyond the social interaction perspective, we also situate gaze following within a developmental and dynamic cognitive system (Corina & Singleton, 2009). Control of one's attention allocation is part of a larger cognitive system regulated by the Executive Functions of the brain. Self-regulation requires both active attending as well as inhibition (i.e., suppressing one's interest in an attractive object in response to a caregiver's bid for attention). As a child builds capacities in basic attention regulation, one sees growth in more *higher order* cognitive processes such as working memory, planning, and cognitive flexibility (Ruff & Rothbart, 1996). It is important to note that all children, hearing or deaf, are visually oriented and develop gaze-following behavior that is eventually self-regulated. What is unique about being raised in deaf, sign language-using families, is that attracting, maintaining, and directing an infant's visual attention is essential for visual language communication to take place. The literature on deaf caregivers' visual engagement patterns suggests strongly that their young children are being socialized to attend differently. Caregivers are creating a developmental niche that appears to capitalize upon the visual modality and results in a unique shaping of an infant's attentional

capacities. In a sense, they are building *modality capital*, through which caregiver-child interactions — replete with attention-shifting and linguistic demands — become a synchronous and everyday experience.

**Socialization of Deaf Children's Visual Engagement**

The social and communicative interactions between Deaf caregivers and their deaf children have also been studied across many cultural contexts (see Harris, 2000, and Spencer & Harris, 2006 for reviews).[i] Many deaf caregivers engage their young children in particular ways that attract and maintain their visual attention ensuring that the child is able to see the signed language input the caregiver provides. Some examples of this *visual attunement* include producing signs within child's visual field, pausing their signing until the infant is looking, moving objects closer to the caregiver's face, using more exaggerated facial expressions, imparting rhythmicity in a sign's movement, and use of visual attention-getting behaviors like waving at or tapping the child. Some caregivers also use tactile, vocal, and kinesthetic stimulation (Harris et al., 1989; Koester et al., 1998; Koester, Traci, Brooks, Karkowski & Smith-Gray, 2004; Spencer & Lederberg, 1997). As an apparent accommodation to their infant's immature visual attention, deaf caregivers also appear to use shorter phrases and repetition in their signing (Spencer & Harris, 2006). This strategy enables them to capitalize on the potentially brief window of opportunity of mutual connected eye gaze and provides multiple opportunities for the child to make associations between the visual referent and the signed form. Many of these caregiver behaviors decrease over time as the infant increases their self-regulation of attention (vis-a-vis accrued *modality capital*) as well as understands that the tapping or waving signal means look to the caregiver for language. Eventually, the child will anticipate the

appropriate time to look-to-caregiver, relying upon linguistic devices and turn-taking cues present in the discourse, rather than being physically tapped by the caregiver.

From the perspective of the child, we know that deaf children born to deaf (DoD) families appear to show early control over their eye gaze. Lieberman and her colleagues (2008; Lieberman, Hatrak & Mayberry, 2011) investigated Deaf mothers and their children engaging in booksharing activities. They observed that even by the age of 2, the DoD toddlers more frequently shifted their eye gaze back and forth between the caregiver and the book as compared to deaf children of hearing parents. We also know that compared to Deaf children of Hearing parents (DoH), DoD engage in more spontaneous looking to their caregiver (which requires inhibiting one's attention from an interesting object and shifting one's gaze to the caregiver) (Harris & Mohay, 1997). This is not to say that hearing caregivers do not engage in meaningful visual engagement behaviors with their deaf child, but the primary finding from accumulated observational research is that there is more variability in hearing parents' attention-getting strategy use, greater asynchrony in their timing of sign production, and their "bouts" of joint attention with their deaf child are shorter (thereby leaving a narrower window of language learning opportunity) (Spencer & Harris, 2006). Furthermore, Prezbindowski, Adamson & Lederberg (1998) contend that deaf children of hearing caregivers exhibit atypicality in their regulation of attention "..long before they exhibit noticeable language delays" (p. 386).

To summarize, research on caregiver-child interaction in infancy and toddlerhood suggests that children born to deaf families are being socialized into a visual language community through a set of caregiver behaviors that ensure the child will develop the capacity to explore the world of visually interesting objects and, by shifting their attention, orient their gaze to their caregiver to receive contingent signed language input.

However, for deaf children born to hearing parents (approximately 90-95% of the deaf population), the early childhood education classroom may be the first caregiver-like context in which they are exposed to the kinds of systematic socialization of visual attention observed in deaf-deaf family dyads. There are a few classroom studies of gaze following with documentation of teacher's use of visually based socialization practices. Mather and her colleagues (1987, 1989; Mather & Andrews, 2009; Mather & Thibeault, 2000) have conducted several studies of gaze in deaf or signing preschool settings. They found that deaf signing teachers used particular patterns of gaze to signal their intended addressee (group/audience or individual)[ii] and convey important discourse cues to their conversational partner. Mather and Thibeault (2000) explain that signers use gaze, along with the creation of a surrogate signing space and head/shoulder tilts, to convey constructed dialogue or fictitious conversations. Such embodied role shifts tell the other signer that you are not speaking directly to them, but rather you are becoming another character, or "reporting speech." This way the addressee understands that the storyteller is no longer in narrator mode, but is constructing the dialogue in the story. Hearing children can rely upon auditory cues such as changes in voice quality and other paralinguistic features to identify which character the narrator has become. In contrast, deaf children rely upon the rapidly shifting and complex eye gaze behavior and body posture of the storyteller to follow the discourse shifts.

To investigate the visual engagement patterns of a deaf teacher interacting with deaf (n=2) and hearing (n=2) preschoolers as they engaged in different play contexts (play dough and dramatic play), DeLuzio and Girolametto (2006) adapted Koester et al.'s (1998) coding system for documenting caregiver's attention-eliciting behaviors. While no differences across play contexts were found, the deaf educator relied heavily upon tactile and visual attention-getting

strategies with her 3 and 4 year old students. The authors suggest that the educator may also have responded differently to the hearing status of the child, but they did not provide corresponding data broken down with respect to this issue.

Smith and Ramsey (2004) looked at older deaf students in fifth grade and analyzed their classroom interactions with a deaf teacher. While the focus of this study was more on "instructional conversation discourse features," there were some documented patterns of gaze, nonmanual markers, and discourse-embedded cues that were deployed by the teacher to control conversation flow. The teacher was also persistent in her attempts to get deaf students engaged and frequently checked their comprehension (often through a subtle nonmanual marker). Smith and Ramsey also noted that the students in the class used hand-raising and hand-waving to gain the teacher's attention (p. 54).

In sum, a young child immersed in a visual language community (or *developmental niche*) learns to rely on complex eye gaze signals in order to gain access to linguistic input (signed language) and acquire the social interaction norms for visual language exchanges. Beyond the aforementioned studies, we still need to document socialization processes of visual engagement to a level that will help us understand *what works* in educational settings and how particular instructional strategies may be more effective than others in attracting, maintaining, and directing children's eye gaze.

For this study, we conducted naturalistic observations of deaf teachers in early childhood deaf education classrooms, across several different interaction contexts, to document the kinds of teacher practices that were used to socialize preschooler's visual attention. By examining the types of preschool teacher visual engagement strategies, as well as to whom (Deaf of Deaf, or

Deaf of Hearing) a particular strategy was directed, we are able to characterize teacher socialization practices, as well as obtain an indirect measure of the child's attention.

## Method

### Participants

This in-depth study focused on the visual engagement behaviors of one teacher and one teacher's aide, both of whom are Deaf and highly fluent in American Sign Language. Six children in the selected preschool, all with profound or severe-to-profound hearing loss, participated in the study (see Table 1). Child 1 was a four-year old male with deaf parents; Child 2 was a five-year old female with hearing parents; Child 3 had a cochlear implant on the right side that was not in use, and his parents are hearing; Child 4 was a four-year old male with deaf parents. Child 5 was a five-year old female with hearing parents, and was, at the time of the study, in foster care with hearing guardians. Child 6 was a five-year-old male with deaf parents. All the children with deaf parents used ASL as the primary language used in the home.

### Context: Bilingual ASL/English Preschool for Deaf Children

To examine visual language engagement, we analyzed videorecorded data that captured natural interactions in preschool classrooms between deaf teachers and deaf children who are four to five years old. The selected preschool is part of a residential school for deaf children adopting a bilingual, bicultural approach to communication. The school uses two languages for communication: ASL and English (primarily through the written form, although some students also received spoken English instruction). The data are drawn from a larger collection (18 hours) of videorecordings from multiple preschool and nursery school classrooms. The classroom interactions were recorded using a single video camera on a portable tripod during six visits over one semester. Different activities were recorded including group-based and individual activities

involving several Deaf teachers. One researcher operated the camera while the other researcher took field notes. Both researchers collecting the original data are hearing and fluent in American Sign Language. Both researchers spent time observing in the classrooms prior to the onset of videorecording so that the children were used to their presence. From the videorecordings it is evident that the teachers and children were going about their everyday classroom business and did not find the presence of the camera intrusive. For the purpose of this study, a subset of the larger archive, two episodes of teacher-led group booksharing sessions, was selected and analyzed for visual engagement behaviors.

**Episode Selection**

We targeted teacher-centered booksharing sessions because these contexts require a high level of visual engagement and attention management (both teacher-directing and student self-regulating). In these episodes, the teacher is typically seated on the floor with the 6 children seated facing her in a semi-circle. The teacher must gain and maintain the children's attention and also the children must rapidly shift their gaze to other children as children take turns "holding the floor." Additionally, the teacher directs children's attention to a particular child, a book, or other visual media (such as a calendar). The children must also vie for the teacher's attention and know when it is appropriate to make such bids.

Two representative teacher-directed booksharing sessions were selected as candidates for detailed analysis of the ways that teachers structure the visual attention and participation of students. The first episode was just over 20 minutes in length, and the second was closer to 16 minutes. In the first episode, the teacher introduced students to a particular storybook for the first time. In this activity, the teacher did not read the book verbatim, but instead let students examine each page and offer their own comments about the story (a *picture walk*). There was

minimal structure and students were free to respond when they had ideas to share. In the second episode, videorecorded on a different day, the same teacher engaged the same children in a dramatic *roleplay* retelling of the same storybook used in the earlier picture walk episode. In this activity, the teacher assumed the role of the main character in the book and each student played a specific animal character found in the story. The students were now familiar with the story because of prior teacher readings before this point in the data collection. The students knew the content of the book and knew their responses were to follow the actions their animal characters experienced in the story.

The storybook, *Ask Mr. Bear* (Flack, 1932), was used in both videorecorded booksharing activities. The book is about a boy who goes out looking for a birthday present for his mother. In his search, the boy meets different animals and asks them if they have anything to offer as a potential present (e.g., feathers, wool, milk, cream). As he meets each animal, the boy finds that he already possesses what each animal has to offer until he meets Mr. Bear who suggests that he give his mother a bear hug.

**Context for Episode 1 (Picture Walk).** In the first group activity, the picture walk, the teacher tries to connect the animal characters in the book with the students' own experiences with animals. She opens the activity by discussing what students saw at a previous class field trip to the zoo. The teacher asks each student to recount his or her experience on the zoo trip, rapidly moving from one student to the next. In the middle of this sequence, the teacher stops at one student because she remembered that he did not go on the zoo field trip because he had his tonsils removed. The teacher uses this opportunity as a teachable moment for the group, and begins talking with the student about his hospitalization, while encouraging the rest of the students to watch the conversation to learn from it. After this sidebar with the zoo-absent student,

the teacher resumes asking students about zoo animals. She subsequently asks the children to predict what animals they might see at an upcoming field trip to a farm. After the question and response activity about the farm animals, the teacher introduces the *Ask Mr. Bear* book to the students and explains that she wants their input about the story. However, the students were quite distracted and it took her a considerable amount of time to get them settled down and focused on the main part of the activity. After the teacher gains the students' attention, she begins the picture walk activity. She subsequently shows the students each page, pointing to specific features in the illustrations, and asks students to share their thoughts. In the middle of the activity, a few students lose focus and begin to play and disregard the book sharing activity. The teacher regains the attention of the students and encourages them to focus again on the picture walk activity. Once the students are resettled, she continues the picture walk until its completion. Table 2 provides an event breakdown and description of the picture walk booksharing activity.

**Context for Episode 2 (Role Play).** The second group activity, the role play, occurred two weeks later. In the role play, the teacher displayed a tray of props that included a paper cut-out picture of each animal, an index card of character's name, and a specific item relevant to each animal (e.g., wool for the sheep, feathers for the duck). The role play activity was obviously familiar to the students. The teacher began the activity by stating it [the story] was the same as the day before. Immediately, several students got up from their sitting position in the semi-circle and crawled over to the prop tray and began to grab props for a character they wanted. The teacher and aide had to get the attention of several students, encourage them to sit down, and assure them that they would each have their opportunity to select a character. Once the students were settled, the teacher asked each student what character they preferred and distributed the corresponding prop from the tray to each student. She then initiated the dramatic

role play story retelling of *Ask Mr. Bear.* In the role play, the teacher assumed the main character role of the boy in the story and then engaged each student as his/her specific character in the order they appeared in the book. An event breakdown of the role play activity is detailed in Table 3.

**Coding Procedure**

Our coding procedure was an integration and modification of coding systems used by three different research groups in their analysis of classroom interactions involving deaf students (Mather, 1987, 1989; Mather & Thibeault, 2000; DeLuzio & Girolametto, 2006; Smith & Ramsey, 2004). Mather and colleague (Mather, 1987, 1989; Mather & Thibeault, 2000) have analyzed preschool classroom interactions with deaf students and teachers and classified whether the teachers' gaze was directed toward the entire group or toward an individual student. DeLuzio and Girolametto (2006) analyzed how teachers used visual and tactile strategies to gain or regain students' attention in structured and unstructured educational contexts. Finally, Smith and Ramsey (2004) investigated classroom discourse practices, for example speaker roles and devices that maintain discourse coherence. Our adaptation combines and extends these authors' research by including a range of Attention-getting and Attention-directing behaviors produced by the teacher as well as how the teacher managed the participation roles of the children in both structured and unstructured discourse settings. These specific actions are further detailed in the next section. To be clear, the students' attention actions (e.g., direction of eye gaze) were not directly measured in this coding scheme because, with the limitations of a single camera view, we could not reliably record all of the student's behaviors.

The present authors are both hearing native signers of ASL. The first coding pass (transcription and category decisions) was conducted by Author 2. For reliability purposes, 25%

of these actions were also coded by Author 1 (with 95% agreement between coders). In addition, 25% of the events were coded by a Deaf native ASL signer. Although this individual was less familiar with the coding system, we still reached 90% inter-coder agreement.

**Attention Actions and Participation Cues of the Teacher**

The teacher's production of *Attention Actions* and *Participation Cues* emphasize different aspects of the socialization of children's visual engagement. Attention actions represent behaviors used by the adult to direct the eye gaze of the students, either toward the adult requesting the attention (i.e., toward self) or to another target, such as another adult, classmate, or resource. Participation cues represent the kind of scaffolding an adult produces within discourse that serves to maintain discourse cohesion (e.g., NOW, OK) but also implicitly conveys that "you should be looking at me"; and, also cues that inform or shape the child's behaviors with respect to appropriate participation in a visual-language using group interaction (e.g, WAIT, HOLD, YOUR-TURN). For example, in our observations, adults used Participation cues to support students' development of appropriate timing for turn-taking and cues about positioning themselves for successful visual engagement (e.g., sitting upright and ensuring no obstacles or people are obstructing the child's view of the signer).

*Attention Actions* produced by the teacher and aide are further divided into two types: Attention-Gaining actions and Attention-Directing actions. *Attention-Gaining* actions serve to attract the gaze of students toward the teacher. *Attention-Directing* actions attempt to re-direct the attention of a student to another adult, peer, or target object. Both types of Attention actions include the same three categories of prompts used by the adult: linguistic, physical, and non-manual. *Linguistic prompts* are single signs or short phrases such as HEY! (hand-wave), PAY-ATTENTION, LOOK-AT-ME, LOOK-AT-HIM. These signs are produced within the visual

field of the student(s). *Physical prompts* are light touches or taps on the child's body (e.g., shoulder, arm, leg) or physical actions on an object (e.g., shaking an object to attract the child's attention). Non-manual prompts are actions that include only the use of facial expressions or head/body behavior (e.g., tilting head) to draw the child's attention toward the adult or another person (there is no co-occurring sign with the non-manual prompt). While it is not discussed specifically here, many of the linguistic prompts did co-occur with animated facial expression – this would be expected in the child-directed register that is being used by the teacher. A list of Attention Gaining and Directing examples is provided in Table 4.

*Participation Cues* are defined as an adult conveying to students, through their discourse, the expected norms for how to be involved as a member of the visual language learning community (see Table 4). As Smith and Ramsey (2004) documented in a fifth grade classroom of deaf students, the deaf teacher invited students to participate in the teacher-directed group interaction, using signs like "NOW" or "OK", conveying that it is time to be quiet and pay attention. In a classroom of deaf students, the teacher will establish individual gaze and/or point, nod, or use a nonmanual marker to a child to yield them the speaker's role (Mather, 1987; Smith & Ramsey, 2004). Sometimes her hand will remain pointing to help other children find the child who now has the floor. This placeholder also conveys that other children should not interrupt. The children can also anticipate their upcoming turn when the teacher invites them with the sign, YOU-NEXT!

Successful participation in a visual language community also requires *optimal* visual engagement, ensuring that no obstacles or persons are obstructing their view of the teacher's signing. For example, the teacher may issue a directive telling a child to alter their undesirable or view-obstructed position, by signing phrases such as MOVE-BACK, MOVE-FORWARD, SIT-

UP, SEE CLEARLY?.

Participation cues also include teacher behaviors that have the effect of delaying or refusing a child's bid for participation. For example, when a child tries to interrupt the teacher or another child who is signing, the teacher tries to *delay* the child's participation, by using signs like WAIT (index finger held up), HOLD, WILL++ (e.g., you will have your turn). Sometimes, when a child persistently tries to get the teacher's attention (when the teacher is attending to another child), even after they have been asked to wait, the teacher will *refuse* their bid by purposely not looking at them or even gently pushing their waving hand down.

## Results

The purpose of this study was to examine the ways in which deaf teachers scaffold the development of deaf preschoolers into becoming fully participating members of a visual language community. Our naturalistic classroom observations focused on one deaf teacher, and one deaf teacher's aide, as they interacted with 6 deaf preschoolers in two separate teacher-directed group instruction settings. The first episode, the *Picture-Walk* (21m, 33s), was considered less-structured and allowed for the preschoolers to freely participate in the communication interaction as they sat in a semi-circle facing the teacher who was walking them through a children's picture book without explicitly reading it to them. The second episode, the *Role Play* (15m,40s), was more structured than the first activity as each student was provided with an explicit participation turn (role play) in the story-retelling. Turn-taking in this activity was regulated by the teacher. This observation also involved a deaf teacher's aide who was sitting amongst the children in the semi-circle facing the teacher.

Our analyses for this study focus on the Attention Actions and Participation Cues produced by both the teacher and the teacher's aide. We counted the number of prompts geared

toward the whole group (as indicated by what Mather (1987, 1989) terms *group-directed gaze or audience gaze)* or toward individuals (*individual-directed gaze)*. These individual prompts were also divided according to whether they were directed toward deaf children of deaf parents (DoD), or deaf children of hearing parents (DoH). We are especially interested in whether the patterns of teacher behavior differ when they are directed toward DoD as compared to DoH. This comparison is of particular interest as we hypothesized that DoD preschoolers would less often be the target of attention-gaining or directing actions from the teacher as they would be expected to possess more advanced visual engagement skills because of their experience in the home environment of being socialized early into a visual language community. We suggest that the teacher's role here is to promote visual engagement skills for all children, but perhaps even more so for the DoH children who are presumably entering the classroom (i.e., this *developmental niche*) with less prior visual language experience (i.e., less *modality capital*).

**Attention-Gain Actions**

The teacher used Attention-Gaining actions to elicit the students' attention either through Linguistic prompts (e.g., handwaves, LOOK-AT-ME), Physical prompts (e.g., light touches on the body), or Non-Manual prompts (e.g., raised eye brows). Overall, we documented a total of 187 Attention-Gain (AG) prompts that the teacher directed to students in Episodes 1 and 2 combined. Of the 187 AG prompts, 109 (58%) were directed toward students who had hearing parents (DoH), 65 (35%) were directed toward students with deaf parents (DoD), and 13 prompts (7%) were directed toward the class as a whole. These results are summarized in Table 5.

The overall results indicated similarities and differences in the types of Attention Gaining prompts geared toward the DoH and DoD students. Both groups of students received a similar number of Linguistic prompts (n=35) and Non-Manual prompts (n=6 and n=4, respectively)

directed towards them. While the nonmanual prompts were used sparingly as an isolated directive (e.g., raised eye brows), this nevertheless appears to be a subtle and effective tool used to gain the student's attention.

In contrast, the DoH received far more Physical prompts (71 out of 102) from the teacher than did the DoD students (28 out of 102). This difference is illustrated by the fact that the teachers often resorted to a physical touch to get the attention of the DoH students, especially if they were unable to get their attention through the discourse-embedded strategies of linguistic or nonmanual prompts. In comparing the two episodes, it is clear that when the Teacher's aide was present, the teacher lessened her use of the Physical prompts, relegating that responsibility to the aide (Note: we observed on the video the teacher asking the aide to sit near the three DoH students to help manage their behavior). Specifically, in the Picture Walk (Episode 1), the teacher directed more Physical prompts toward the DoH students (n=31) than the DoD students (n=12). In the Role Play (Episode 2), the teacher and aide combined directed 40 Physical prompts toward the DoH students compared to only 16 toward the DoD.

**Attention-Directing Actions**

The teachers used the Attention-Directing (AD) actions to help students focus their attention to the primary person (e.g., teacher or student) or object of interest. As summarized in Table 6, of the 43 AD actions documented in both episodes, by both teacher and aide, 42 were Linguistic prompts (e.g., LOOK-there) and 1 prompt was Physical (the aide touched an object that a student was holding). This makes sense because within Deaf Culture one would not normally rely upon a physical prompt to re-direct the child's attention (e.g., placing one's hand on their head and turning it to the new target). In total, 86% of the AD actions produced by the teachers were directed toward the DoH students (n=37), while the DoD received only 12%

(n=5). Only one linguistic AD prompt (2%) was directed toward the class as a whole. Due to the nature of the activity, the teacher used the Attention Direct prompts sparingly, as she was focused mostly on gaining the attention of and eliciting information from the students. By comparison, as is appropriate for her role, the Teacher's aide made far greater use of the Attention Direct prompts (e.g., LOOK-AT TEACHER!) to scaffold the direction of the DoH students' gaze.

Figure 1 illustrates the combined pattern of results presented in Tables 5 and 6.

**Participation Cues**

The Participation cues were divided into types of cues that appeared to encourage students' positive participation (Invite) with those that discouraged negative behaviors such as interruptions (Directive, Delay, Refusal). The results of this analysis are summarized in Table 7 and Figure 2, with details reported in the following section.

In terms of positive Participation cues produced by the teachers, a total of 41 Invites were documented across both episodes. The DoD students received 23 Invites (56%), compared to 10 Invites for DoH (24%), and 8 were offered to the whole group (20%). The teacher's pattern of Invites seemed to vary by context. The Picture Walk was much more unstructured and the teacher noticeably directed more of her Invites toward individual DoD students (n=14) compared to DoH (n=5) students and the whole class (n=5). This pattern may reflect a higher level of language abilities of the DoD, and the fact that they were reliably visually engaged, as compared to the DoH students. The DoD students often provided more elaborated responses to the teacher's question, while DoH students more typically gave minimal (one word) responses, to which the teacher consistently expanded upon or asked follow-up questions to elicit further information.

In the more structured episode, the Role Play, each student had an assigned role and turns were negotiated by the teacher; this structure limited the opportunity for students to contribute spontaneously. As a result, the DoD received comparably fewer invites (n=9) than the unstructured episode (n=14), while the invite number for the DoH (n=5) remained the same across episodes.

In terms of Participation cues to discourage students' negative behavior, the DoH received a substantially larger number of corrective prompts from the teachers. Across the two episodes, a total of 76 cues were documented (Directive, Delay, and Refusal); among these, the DoH received 55 prompts (72%), the DoD received 15 prompts (20%), and the whole class received 6 prompts (8%). Across the two episodes, the DoH students received a similar number of Directives from the teacher (about 10 per episode); however, an additional 10 Directives were issued to the DoH by the aide during the Role Play episode. By contrast, the DoD received a total of only 5 such prompts across the two episodes from both teachers. Similarly, the DoH received more Delay actions (n=9) from the teacher and the aide, as compared to the DoD (n=2). This was especially evident when the students were bidding for characters in the beginning of the Role Play activity.

Likewise, the DoH students were the primary recipients of the Refusal cues used by the teacher. The teacher conveyed her refusal to yield the floor by refusing to grant eye contact to student(s) who were deliberately waving or physically touching her while she was signing to another student, looking up information in a book, or attempting to distribute a prop to a student. Across both activities, there were a total of 20 occurrences where the teacher refused a student's inappropriate bid for attention. Of the 20 occurrences, 17 involved DoH students (85%), and 3 involved DoD students (15%). A majority of these Refusals occurred during the unstructured

Picture Walk activity (16 of 20), when the DoH students seemed to be less able to navigate the turn-taking appropriately without the clear cues provided by the structured episode.

## Discussion

This classroom observational study focused on how Deaf preschool teachers establish successful visual engagement through American Sign Language with their deaf students. We noted that across the different group contexts we observed, all preschoolers are frequently prompted by the teacher with linguistic reminders regarding where to direct their attention. However, two further insights have emerged from these descriptive findings. First, the teachers' differential behavior toward deaf children of deaf parents (DoD) and deaf children of hearing parents (DoH) provides compelling evidence that by age 4 DoD are well on their way to possessing self-control over their visual attention and understanding the turn-taking expectations of a visual language community. In many cases, the DoD only needed the teacher's more subtle positive participation cue (e.g., "READY?") to alert them that it was time to pay attention.

By contrast, as evidenced by the teacher's increased use of explicit attention socialization toward them, the DoH children appear to still be developing their self-regulatory capacity in this domain. The DoH preschoolers are experiencing more attention-socializing directives that are heavily dependent upon physical prompts and corrective prompts in response to the DoH child's inappropriate bids for attention.

Based on the differential interactions between the Teacher and her DoD vs. DoH students, we posit a developmental progression of attention development and suggest that teachers use certain strategies to develop it. We suggest that DoD preschoolers arrive to the classroom with a well-established understanding of visual engagement because they have been raised within a developmental niche that promotes this self-regulation. Spencer et al., (1992)

observed that between 9 and 18 months of age, deaf caregivers first use physical tapping to attract their deaf infant's attention and then shift to using more linguistic cues as they approach 18 months of age. Eventually the young DoD children anticipate their caregiver's signing because they had internalized the turn-taking rules of ASL-based discourse. With the DoH children in this study, it appears that the teachers may be mirroring the kind of physical engagement patterns observed in Deaf Caregiver-Infant dyads and that they transition from such prompts to discourse-embedded cues.

A second interesting finding emerged with respect to the nature of the classroom activity. One activity (Picture Walk) was more unstructured, while the other (Role Play) had well-defined, predictable turns for the children to take. Because the unstructured activity puts more of the self-regulation and communication burden on the child, the more-skilled DoD had a clear advantage over the DoH students. In this setting, the DoH frequently interrupted the teacher and needed to be directed more often. By contrast, the Role Play activity was more structured with predictable turn-taking patterns. Here, we did not observe the DoH children interrupting, however the teacher and the teacher's aide were still fairly directive toward the DoH to help them keep on task and support their engagement in the structured pattern.

## Conclusions and Implication for Practice

To conclude, the results from this in-depth observation of teacher-student interaction suggests that Deaf teachers use socialization patterns for promoting deaf preschooler's visual engagement in ways reminiscent of how Deaf caregivers engage with their deaf children in infancy. Overall, we observed that the Deaf children from deaf families arrived to the preschool already knowing how to engage visually and were thus *ready to learn* and responded well to the teacher's explicit and implicit (discourse-embedded) attention prompts. Teachers more

frequently invited Deaf children of Deaf parents to participate because it appeared that they had anticipated her invitation (i.e., they were already looking at her when she was doing the inviting and could thus appropriately respond). For those Deaf children of hearing parents who appear to be still developing their self-regulation of attention capacity, the teachers more often used physical prompts (such as a physical tap) to attract and direct their attention because, based on our observation, it appeared that the students had not visually anticipated her invitation to participate.

What are the implications of this research for teachers of Deaf/HH toddlers and young children? Teachers, or Teacher's Aides, may want to sit close enough to emergent signers so that they can use a physical touch to alert them to attend. Gradually, a teacher should be using more linguistic prompts, and decreasing the use of physical signals to promote the child's self-regulation of attention. Also, gradually decreasing the frequent repetition of instructions (often done to accommodate a child who has missed the teacher's earlier signing) and moving toward increasing the children's reliance upon discourse-embedded participation cues (e.g., READY? or NOW) that signal the upcoming teacher's instruction.

Structured group participation activities can also help a child engage with their teacher and peers in visually predictable ways (e.g., following a fixed order for activities that require individual turns). But it will be important to mix in more unstructured activities gradually and give children increasing experience with spontaneously requesting a bid for attention, holding the floor, and shifting their gaze to other participants. For example, fun games where different children in a group unexpectedly become "it" may promote vigilance in attending to the periphery and using anticipatory looking strategies to track the next "it" person. Finally, activities that engage children's gaze, but requires them to shift their gaze amongst a series of

visual targets, may help promote their self-regulation of attention (i.e., anticipatory looking). For example, a child might be expected to shift their attention between the signing teacher, a large flip-chart, and a collection of illustrations (e.g., pictures of farm animals) to be selected from (for putting on the chart). Also, it might be useful to ask two linguistic models to share the storytelling in a bookreading event so that the children must shift their attention between two narrators and the book.

It is reasonable to argue, then, that educational settings that predominantly expect a child to deploy only simple gaze directed toward one person could be limiting in terms of building a child's *modality capital*. For example, in mainstreamed classrooms where the teacher's spoken discourse is (seconds later) mediated through a sign language interpreter, the gaze-shifting demands placed on the child may not be consistent with the goal of developing the natural synchrony and anticipatory looking required in visual language interactions. That is, an interpreter is constrained by his/her own translation processing limitations when attempting to simultaneously render the teacher's English to ASL (as opposed to consecutive translation). While the timing of the interpreter's message delivery may offer intermittent opportunities for the child to shift their gaze from the interpreter back to the English-speaking teacher, these idiosyncratic pauses are controlled by the interpreter rather than the child and thus may not be appropriately synchronized with the other educationally relevant visual targets (e.g., teacher's points to a visual chart or written text on the board).

While this study offers an in-depth look at deaf teacher - deaf student interaction using a visual engagement lens, we recognize that it is based on a sample drawn from a limited context (an ASL-using school with Deaf Preschool teachers). In the future, it will be important to examine visual engagement across a broader range of structured and unstructured educational

contexts, including children with different language and modality experiences (e.g., deaf children with cochlear implants, hearing children of deaf parents acquiring both English and ASL). Such observations should capture (through multiple camera vantage points) the contingencies of the relationship between particular teacher attention getting actions and a child's visual engagement outcomes. In addition, it will be important to examine the role of other language models besides the teacher (e.g., DoD students) and discern how peer-to-peer learning processes may help a novice strengthen their visual engagement skills.

Nevertheless, it is interesting to note that, generally speaking, *developmentally appropriate* or *best practice* in early childhood education would not necessarily advocate for a heavy reliance on teacher-centered group-based instruction, favoring instead free-choice, center-based, discovery-type learning. In the context of deaf education, however, it may be the case that a child draws different benefits from group instruction or teacher-mediated interaction especially because such contexts provide rich exposure to *visual engagement* (i.e., increased attention shifting and anticipatory looking).

As we consider best practices, we aim to develop classroom and home-based activities for teachers and parents that promote self-regulation of attention *in the context of visual language learning*. For example, an intervention could be modeled after the *Tools of the Mind* curriculum, which was developed by Bodrova and Leong (2007) and evaluated for efficacy by Adele Diamond and her colleagues (Diamond, Barnett, Thomas & Munro, 2007; Diamond & Lee, 2011). This curriculum promotes executive functioning in early childhood and includes, for example, activities where children practice self-regulation by turning off and on speaking and listening roles when engaged in group and peer interaction.

A final point to emphasize here is that we conceptualize the promotion of a child's

modality capital by immersing them in a natural visual language and *scaffolding their visual engagement*. Like Dye, Hauser, and Bavelier (2008), we do not feel that stripping down a child's visual world by eliminating all visual distractions (e.g., placing him in the front of the class or setting up physical barriers to reduce visual access to background distractions) is an ecologically valid approach to strengthening their visual engagement skills (in fact, Dye et al., argue that such arrangements may even exacerbate the situation). Because deaf individuals have adapted their visual systems to maintain vigilance in attending to their periphery while attending to a central point of focus (Proksch & Bavelier, 2002), it is the *unexpected* visual distractions in the periphery that appear to be the most intrusive. Dye et al suggest that we allow a child *to learn* the expected level of visual noise and adapt to the visual demands of their authentic learning environments. By structuring their visual engagement experiences, we *increase the predictability* of their interactions, which may subsequently reduce their sensitivity to peripheral distractions. We would also argue that to strengthen the ecological validity of this structuring, we must look to how Deaf parents and Deaf teachers have routinely solved this challenge vis-a-vis their *indigenous practices* (Humphries, 2004). By applying these culturally- and modality-appropriate modes of language and visual socialization in the classroom, we will hopefully create developmental niches that optimize deaf children's learning.

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Table 1

Child Characteristics

| | | | Hearing Status | | |
|---|---|---|---|---|---|
| Child | Gender | Age | Child's | Parents' | Ethnicity |
| 1 | Male | 4;8 | Profound | Deaf | European American |
| 2 | Female | 5;5 | Severe to Profound | Hearing | European American |
| 3 | Male | 5;8 | Profound | Hearing | European American |
| 4 | Male | 4;6 | Severe to Profound | Deaf | European American |
| 5 | Female | 5;10 | Profound | Hearing | African American |
| 6 | Male | 5;0 | Profound | Deaf | European American |

Table 2

Periods within Episode 1 - Picture Walk (Total Time: 21:33)

| Period | Minutes | Description |
|---|---|---|
| Introduction | 3:55 | The teacher connects a previous zoo fieldtrip and an upcoming trip to a farm to prepare them for the *Ask Mr. Bear* book, which features several animals |
| Sidebar | 2:01 | The teacher interrupts her introduction to engage in a sidebar conversation with a student about his experience getting a tonsillectomy |
| Transition | 1:43 | The teacher prepares the students for the book sharing activity by providing instructions for the Picture Walk activity |
| Main Activity (Picture Walk) | 13:01 | Students describe what they think is happening on each page of the book. The teacher scaffolds students' learning by elaborating upon their responses |
| Refocus | 0:53 | During the middle of Picture Walk, the students become somewhat inattentive and the teacher redirects their attention back to the book |

Table 3

Periods within Episode 2 (Role Play) (Total Time: 15:40)

| Period | Minutes | Description |
|---|---|---|
| Introduction | 1:55 | The teacher and aide work to get the students settled and explain the upcoming activity |
| Distribution | 3:40 | The teacher distributes the props that the students will use during the storybook activity |
| Transition | 0:45 | The teacher and aide work to settle the children and begin the storybook activity |
| Main Activity (roleplay) | 9:20 | The teacher tells the story by taking on the role of the main character while the students respond according to their assigned character in the book. The book text is not "signed aloud" word by word |

Table 4

Coding Category Descriptions: Teacher's Visual Engagement Actions

| Type | Category | Description | Examples of signs or behaviors |
|---|---|---|---|
| Attention-Gaining | Linguistic Prompt | Single signs or short phrases used within the visual field of student(s) | PAY-ATTENTION; LOOK-AT-ME; HEY! (Hand-wave); Calling child's name (with namesign or fingerspelling) |
| | Physical Prompt | Light tap or touch on the child when he/she is not attending to the teacher | Tapping, Nudging, Holding different part of body |
| | Non-manual Prompt | Use of non-manual markers (without accompanying sign) in the visual field of the child | Facial expressions (e.g., raised eyebrows for "Well?" or pursed lips for "I'm waiting"); shoulder shrugs |
| Attention-Directing | Linguistic Prompt | Signs or short phrases used within the visual field of the student(s) in order to direct attention toward a person or object. | LOOK-AT-THIS (teacher-student-object); LOOK-AT-HIM/HER; re-directing point |
| | Physical Prompt | Enhancing visual interest of the object to direct child's attention toward it | Shaking an object (e.g., raising a book up and down) to attract the child's attention to it. |
| | Non-manual Prompt | Use of non-manual markers (without accompanying sign) in the visual field of the child | Head tilt and eye glances to direct child's attention toward another person or object |
| Participation Cues | Invite | Action or a statement that signals to student(s) that they should be attending, and may be encouraged to make a statement or ask a question | READY?; NEXT; a point to the person (finger or arm point), a head nod |
| | Directive | Authoritative comment with the intention of monitoring or altering the child's undesirable (e.g., visually obstructed) position, behavior, or action | MOVE-FORWARD, MOVE-BACK, SIT-UP, SEE-CLEAR? |
| | Delay | Comment intended to get students to wait or postpone a specific request or comment | WAIT, WILL++, HOLD |
| | Refusal | Action produced in response to a child who is inappropriately bidding for the teacher's attention. The teacher does not yield her attention to this interruption. | Not giving eye contact to a student who is bidding for attention; pushing down or holding the child's hand |

Table 5

Teacher & Teacher Aide Attention Gaining Actions in the Unstructured Picture Walk (21:33) and Structured Role Play (15:40) Episodes

| Attention Gaining | Tokens | | | Frequency | | |
|---|---|---|---|---|---|---|
| | Group | DoD | DoH | Group | DoD | DoH |
| Teacher (Unstructured) | | | | | | |
| Linguistic Prompt | 3 | 26 | 20 | .06 | .53 | .41 |
| Physical Prompt | 1 | 12 | 31 | .02 | .27 | .70 |
| Non-Manual Prompt | 2 | 0 | 1 | .67 | .00 | .33 |
| Total | 6 | 38 | 52 | .06 | .40 | .54 |
| Teacher (Structured) | | | | | | |
| Linguistic Prompt | 4 | 7 | 12 | .17 | .30 | .52 |
| Physical Prompt | 2 | 16 | 8 | .03 | .62 | .31 |
| Non-Manual Prompt | 1 | 2 | 2 | .20 | .40 | .40 |
| Total | 7 | 25 | 22 | .13 | .46 | .41 |
| Teacher Aide (Structured) | | | | | | |
| Linguistic Prompt | 0 | 2 | 3 | .00 | .40 | .60 |
| Physical Prompt | 0 | 0 | 32 | .00 | .00 | 1.00 |
| Non-Manual Prompt | 0 | 0 | 0 | .00 | .00 | .00 |
| Total | 0 | 2 | 35 | .00 | .05 | .95 |
| Overall Total | 13 | 65 | 109 | .07 | .35 | .58 |

Table 6

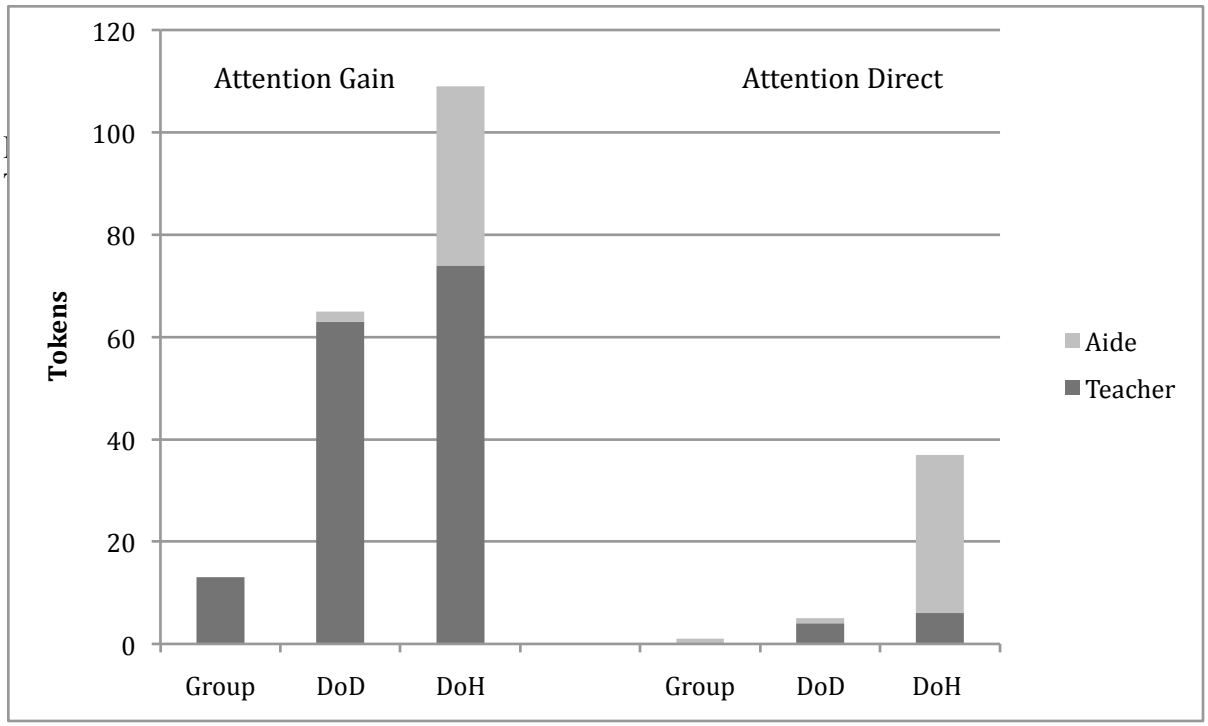
Teacher & Teacher Aide Attention Directing Actions in the Unstructured Picture Walk (21:33) and Structured Role Play (15:40) Episodes

| Attention Directing | Tokens | | | Frequency | | |
|---|---|---|---|---|---|---|
| | Group | DoD | DoH | Group | DoD | DoH |
| Teacher (Unstructured) | | | | | | |
| Linguistic Prompt | 0 | 3 | 4 | .00 | .43 | .57 |
| Physical Prompt | 0 | 0 | 0 | .00 | .00 | .00 |
| Non-Manual Prompt | 0 | 0 | 0 | .00 | .00 | .00 |
| Total | 0 | 3 | 4 | .00 | .43 | .57 |
| Teacher (Structured) | | | | | | |
| Linguistic Prompt | 0 | 1 | 2 | .00 | .33 | .67 |
| Physical Prompt | 0 | 0 | 0 | .00 | .00 | .00 |
| Non-Manual Prompt | 0 | 0 | 0 | .00 | .00 | .00 |
| Total | 0 | 1 | 2 | .00 | .33 | .67 |
| Teacher Aide (Structured) | | | | | | |
| Linguistic Prompt | 1 | 1 | 30 | .03 | .03 | .94 |
| Physical Prompt | 0 | 0 | 1 | .00 | .00 | 1.00 |
| Non-Manual Prompt | 0 | 0 | 0 | .00 | .00 | .00 |
| Total | 1 | 1 | 31 | .03 | .03 | .94 |
| Overall Total | 1 | 5 | 37 | .02 | .12 | .86 |

Table 7

Teacher & Teacher's Aide Participation Cues in the Unstructured Picture Walk (21:33) and Structured Role Play (15:40) Episodes

| Participation Cues | Tokens | | | Frequency | | |
|---|---|---|---|---|---|---|
| | Group | DoD | DoH | Group | DoD | DoH |
| Teacher (Unstructured) | | | | | | |
| Positive | | | | | | |
| Invite | 5 | 14 | 5 | .21 | .58 | .21 |
| Negative | | | | | | |
| Directive | 4 | 1 | 8 | .31 | .08 | .62 |
| Delay | 0 | 0 | 1 | .00 | .00 | 1.00 |
| Refuse | 0 | 0 | 16 | .00 | .00 | 1.00 |
| Negative Total | 4 | 1 | 25 | .13 | .03 | .83 |
| Teacher (Structured) | | | | | | |
| Positive | | | | | | |
| Invite | 3 | 9 | 5 | .18 | .53 | .29 |
| Negative | | | | | | |
| Directive | 0 | 3 | 11 | .00 | .21 | .79 |
| Delay | 2 | 1 | 0 | .67 | .33 | .00 |
| Refuse | 0 | 3 | 1 | .00 | .75 | .25 |
| Negative Total | 2 | 7 | 12 | .09 | .33 | .57 |
| Teacher Aide (Structured) | | | | | | |
| Positive | | | | | | |
| Invite | 0 | 0 | 0 | .00 | .00 | .00 |
| Negative | | | | | | |
| Directive | 0 | 0 | 10 | .00 | .00 | 1.00 |
| Delay | 0 | 1 | 8 | .00 | .11 | .89 |
| Refuse | 0 | 0 | 0 | .00 | .00 | .00 |
| Negative Total | 0 | 7 | 18 | .00 | .05 | .95 |
| Overall Positive Total | 8 | 23 | 10 | .20 | .56 | .24 |
| Overall Negative Total | 6 | 15 | 55 | .08 | .20 | .72 |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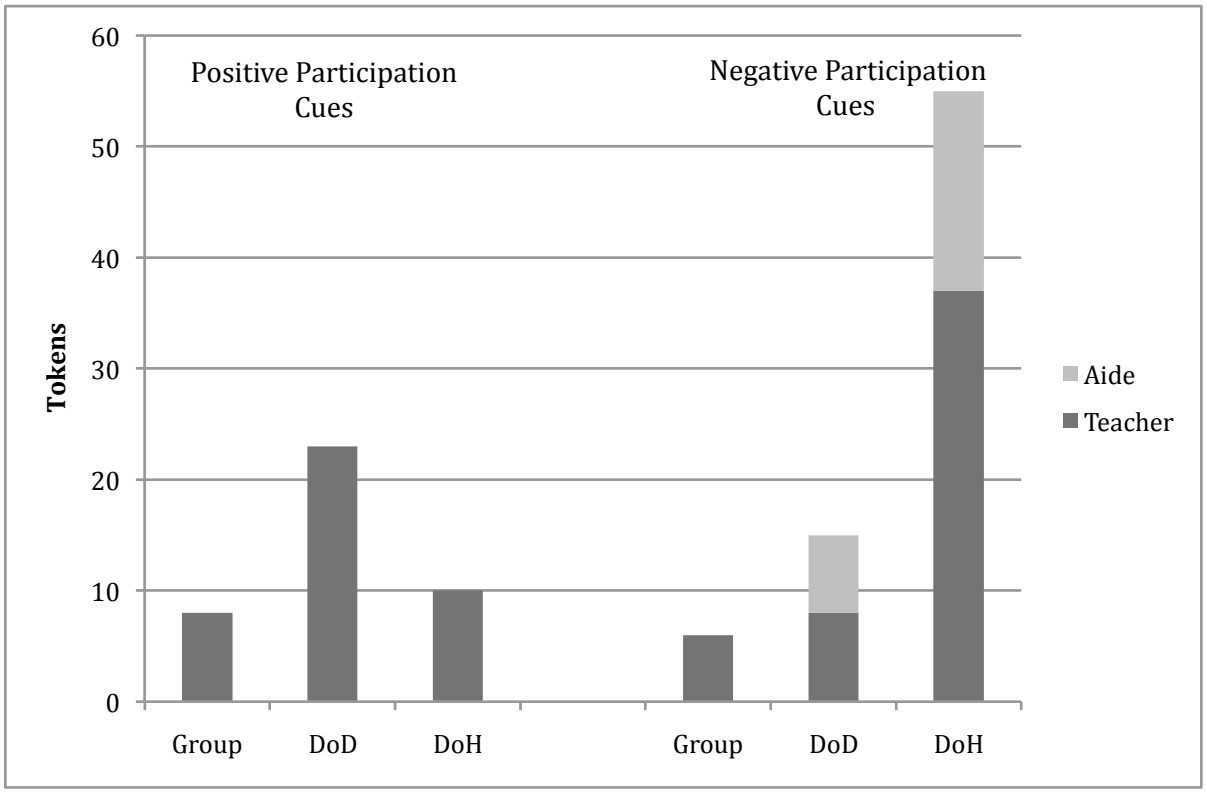


Figure 2. Deaf Preschool Teacher's Overall (collapsed across 2 booksharing episodes) Positive and Negative Participation Cues expressed toward the Whole Group of students, Deaf Children of Deaf Parents (DoD), and Deaf Children of Hearing Parents (DoH)

[i] Studies of Caregiver - Deaf Infant dyads have been conducted in the United States (Erting, Prezioso, & O'Grady Hynes, 1990/1994; Koester, Karkowski, & Traci, 1998; Lieberman, Hatrak, & Mayberry, 2011; Spencer, Bodner-Johnson & Gutfreund, 1992; Swisher, 1992; Waxman & Spencer, 1997), Canada (Jamieson, 1994), the United Kingdom (Ackerman, Kyle, Woll, & Ezra, 1990; Guarinello, Berberian, Santana & Massi, 2006; Harris & Mohay, 1997; Harris, Clibbens, Chasin, & Tibbits, 1989; Smith & Sutton-Spence, 2005), Australia (Harris & Mohay, 1997; Mohay, Milton, Hindmarsh, & Ganley, 1998), Belgium (Loots & Devise, 2003; Loots, Devise, & Jacquet, 2005), and Japan (Masataka, 1992).

[ii] Mather (1987, 1989) reports that teacher's *Group-indicating* gaze employs a "smooth arch-like" glance towards the group and indicates that the teacher's question or comment is intended for all group members. Similarly, *audience gaze* conveys that the entire group is the intended addressee, but in this case a teacher selects a midpoint of the group to affix her gaze, rather than the swoop of the group-indicating gaze. *Individual gaze* is directed at one child and conveys to other members of the group that it is not their turn, rather that the floor is to be held by the specific addressee.