Literacy Behaviors of Deaf Preschoolers during Video Viewing

One of the most pressing concerns regarding the education of deaf children is their lack of academic success as measured by their literacy skills. Most deaf children finish high school reading below a fourth-grade level (Holt 1993; Traxler 2000). This is largely due to the fact that 90 percent of deaf children with hearing families lack a strong language base (Moore and Levitan 2003). The result is that many deaf children enter school with limited language exposure.

It has been shown that early delays in oral language development in hearing children can have a negative impact on their reading comprehension and overall academic achievement (Beimiller 1999). This is also true for deaf children as related to limited exposure to American Sign Language (ASL) (Morford and Mayberry 2000). Research has demonstrated a significant correlation between ASL skills and reading skills (Padden 1996; Mayberry 1993; Wilbur 2000; Padden and Ramsey 1998; Prinz and Strong 1998; Singleton et al. 1998). Deaf children of Deaf parents (DCDP) who have been exposed to ASL from birth develop literacy skills that allow them to continue to outperform deaf children with hearing parents (DCHP) on vocabulary tasks and language skills (Mayberry 1993; Mayberry and Eichen 1991).

Deaf children of hearing parents need early intervention to help them increase their early language skills. In addition, hearing parents
need to learn ways to begin engaging their children in language and literacy activities at a young age in order to narrow the reading gap between deaf and hearing children. The use of educational videos or television programs is a promising method for engaging deaf children in both language and literacy activities.

Since 1970, educational television has been used as a supplemental tool to help hearing children develop emergent literacy skills. Programs such as *Sesame Street*, *Blue’s Clues*, *Reading Rainbow*, and *Between the Lions* have been a successful medium for educating preschool hearing children (Rice et al. 1990; Rath 2002; Crawley et al. 2002).

Deaf children can also greatly benefit from this rich educational medium (Loeterman, Paul, and Donahue 2002). However, the majority of such programs are inaccessible to deaf children because they are designed with hearing children in mind and are thus accessible only via spoken language. The purpose of the study reported here was to determine the extent to which preschool deaf children engage in literacy-related behaviors while viewing an educational video in ASL and to analyze their engagement behaviors.

Theoretical Framework

This study is grounded in the theories of emergent literacy and active viewing. The emergent literacy perspective posits that language and literacy skills develop from birth simultaneously rather than sequentially (Teale and Sulzby 1989; Sulzby and Teale 1991). Sulzby and Teale (1991, 4) maintain that language and literacy skills “mutually reinforce each other” and should both be introduced into children’s lives as soon as possible. Researchers of the language and literacy development of deaf children have also begun adopting an emergent literacy perspective (Williams 2004).

The second theory that guides this study stems from research on educational television. The active viewing theory (Anderson and Lorch 1983) suggests that children are not passive viewers of television as previously believed. Theorists who support the active viewing theory propose that the extent to which children pay attention to television is affected by the effort they expend to comprehend the TV program. They explain that there is a “causal relationship from com-
preparation to attention” (ibid., 14). As applied to this study, the active viewing theory predicts that increased active viewing will enhance video comprehension.

Review of the Literature

Since there is limited research related to deaf children watching educational television, I examined both the research on deaf children who engage in book sharing, as well as that on hearing children who engage with educational television programs.

Strategies for Engaging in Language and Literacy Activities

Deaf adults also use a variety of strategies during book sharing to help build vocabulary and oral language skills. For hearing children, talking while reading storybooks is key to maximizing that experience (e.g., Teale 1984). Some of the strategies that Deaf adults use with deaf children are asking questions about the text or pictures, explaining background information about the text, and/or connecting information in the text to the children’s lives (L. Erting 2001; Andrews and Taylor 1987; Mather 1989).

Because there is not an equivalent sign for every printed English word, deaf children must learn to connect concepts to signs and signs to print (Maxwell 1984). Fingerspelling is one component of ASL that researchers advocate using to help connect children’s knowledge of ASL to their knowledge of English print (Padden and Ramsey 1998). Fingerspelling is the use of the manual alphabet to spell out words, such as proper names, on the hands. Padden and Ramsey (ibid.) have discovered that children do not necessarily have to know how to read the printed alphabet in order to understand a fingerspelled word. Children’s initial attempts at fingerspelling often represent the shape of a fingerspelled word as a single lexical unit rather than individual letters (Akamatsu 1983; Padden 1991).

Researchers have focused on how Deaf adults use fingerspelling during storybook sharing to help children make connections between ASL and English print. For example, Deaf adults label information in stories by “sandwiching,” a process in which they sign a word, fingerspell it, and then point to it again (e.g., CAT C-A-T CAT), or “chain-
ing,” when they utilize multiple combinations of pointing, signing, and fingerspelling: for example, (point to the printed word), CAT C-A-T) (Blumenthal-Kelly 1995; Erting, Thumann-Prezioso, and Benedict 2000; Humphries and McDougal 2000). This strategy is also used by Deaf adults who are working with deaf children who have had minimal sign language exposure (Mather 1989).

**Strategies Used in Educational Television**

Over the past thirty years, programs such as *Sesame Street* and *Blue’s Clues* have incorporated techniques to engage viewers, such as giving the child an opportunity to supply answers before the characters do and using characters who hesitate or make mistakes that viewers can correct (Fisch and Truglio 2001). Additional techniques that *Sesame Street* researchers have found successful are as follows: creating program content that is comparable to children’s real-life situations; providing repetition and reinforcement either within or across episodes; and presenting the same content in different contexts (ibid.). If similar techniques were used in an ASL educational video, the viewers might be encouraged to engage more.

Formative research on *Sesame Street* reveals that children respond positively to interactive elements that allow them to participate in the program. Reports from observational data from *Sesame Street* (ibid.) reveal that when watching *Elmo’s World*, children counted and moved along with the characters and imitated their actions. Crawley and colleagues (2002) also analyzed engagement behaviors of children who were viewing *Blue’s Clues*. They found that the children engaged in verbal behaviors such as answering questions, commenting on or questioning the content of the video, and imitating dialogue and nonverbal behaviors such as nodding and pointing. Results revealed that both verbal and nonverbal interactions (especially answers and imitations) greatly increased with episode repetition (ibid.). In addition, Crawley et al. discovered that comprehension improved after episode repetition.

One study suggests children with limited exposure to sign language might comprehend a video in ASL. Fisch, Brown-McCann, and Cohen (2001) studied hearing children’s comprehension of television programs that used only nonverbal communication. Their results indicate that children between the ages of three and five were
able to comprehend the educational message of the story and that comprehension increased when the messages were “visually concrete.” This study suggests that it might be possible for children who do not know sign language to comprehend a story in ASL if concrete, rather than abstract, visual images accompany the signs.

Educational Television and Emergent Literacy Skills
Educational researchers have been examining the effects of educational television programs for the past thirty years. Most of the programs that have been analyzed air on PBS, particularly *Sesame Street*, *Between the Lions*, and *Reading Rainbow*. Research indicates that watching *Sesame Street* and *Reading Rainbow* positively influences children’s literacy skills, especially their vocabulary (Rice et al. 1990; Wright and Huston 1995; Wright et al. 2001; Graham, Vandergriff, and Burke 2001).

Other evidence indicates that deaf children can learn from educational television as well. One such study was the Cornerstones project. Loeterman, Paul, and Donahue (2002) adapted selected materials from the program *Between the Lions* into ASL (and additional modalities) and created supplementary materials for teachers to use with video clips to determine whether six-to-ten-year-old deaf children would learn from this medium. Their findings reveal that this project was effective in increasing the participants’ literacy skills.

While older deaf children were able to learn from an educational video, there is minimal research on whether *preschool* deaf children will engage in or learn from an educational video in ASL. Taking into consideration that increased engagement reflects increased comprehension, it is important to incorporate successful strategies used both in educational television programs and by Deaf adults during book sharing into the development of an educational video in ASL targeted toward preschool deaf children.

This study is part of a larger one designed to determine whether preschool deaf children will pay attention to, engage in, and learn from an educational video in ASL. Only findings related to literacy behaviors are reported here, and the following research questions are addressed: What types of literacy-related behaviors do preschool deaf children engage in during video viewing? How do these behaviors change after multiple viewings?
Methods

Research Design

This study describes the literacy-related behaviors of preschool children during multiple viewings of an ASL educational video and the frequency of these behaviors. Findings are also reported and cross-referenced with pre- and posttests of targeted and nontargeted vocabulary incorporated into the video.

Participants

The 25 deaf participants ranged in age from three to six years of age and used sign language as a mode of communication (mean X = 4 years, 10 months). Fifteen of the participants were boys, and 10 were girls. Eight had Deaf parents (all from a residential program) and had been exposed to ASL from birth, while 17 had hearing parents, most with minimal exposure to ASL (see appendix A). Fifteen of the children were attending preschool at three different self-contained programs in Colorado. Ten children were attending a residential school for Deaf children in the Midwest (see appendix A).

Setting

I collected data for this project in seven different preschool classrooms and one kindergarten classroom over a span of four months. Three of the programs were self-contained, and one was a residential program. Each class had ten to fifteen children ranging in age from 3 years, 0 months to 6 years, 10 months. All of the teachers in the self-contained programs were nonnative signers. Each of the self-contained programs subscribed to the Total Communication philosophy, and both manual communication and spoken language were used in the classrooms. A Total Communication approach can be described as an English-only classroom since the focus is on spoken English with the support of signed communication (which typically means using English syntax and signing in English word order rather than using a signed language such as ASL, with its own grammar and syntax). “English is the primary language to be developed and maintained, and there is limited use if any of ASL” (Allen 2002, 4).

The fourth program was a residential school for Deaf youngsters.
The school subscribed to a bilingual/bicultural philosophy of language acquisition and therefore facilitated proficiency in two languages, ASL and English. Programs that subscribe to this philosophy incorporate both the children’s first language and culture into the curriculum and promote their competence in both ASL and written English (Grosjean 1992). Participants from the residential school came from four different classrooms. Two of the teachers were Deaf, and two were hearing.

Materials

Based on the research reviewed, I developed a forty-three-minute educational video in ASL (with no sound) targeted toward preschool deaf children. During the video, the main character, Peter, and his sidekick, Rika (a woman dressed as a mouse), take four deaf children on a trip to a farm. Prior to going, Peter discusses what they will see there. Upon returning, they sequence pictures of events that took place at the farm and create a storybook. The video concludes with Peter signing the storybook aloud.

While there are special effects throughout the video, there are no animated characters. Peter is a Deaf man who is a nonnative ASL signer. Rika, who is hearing, is learning to sign and makes mistakes as she goes along. A third-generation native Deaf ASL director participated in all aspects of production, including translation of the written script to ASL, and stayed on the set to oversee the signing of all of the actors.

The video is structured so that the targeted skills are presented again and again throughout the program. Each time they are repeated, various methods are employed to convey the targeted concept (Beck, McKeown, and Kucan 2002). Additional strategies that are used are chaining (Andrews and Taylor 1987; Erting, Thumann-Prezioso, and Benedict 2000; Blumenthal-Kelly 1995), showing ASL and English at the same time (Mather 1989), asking viewers to sign along with the characters (repetition and reinforcement of targeted skills) (Fisch and Truglio 2001), and providing deaf role models.

Vocabulary

While literacy, language, and cultural skills were all part of the video curriculum, ten vocabulary words were targeted and incorporated in
the video. I chose to target certain vocabulary items because such exposure impacts oral language development (Teale 1984) and literacy development (Hart and Risely 1995; Beck, McKeown, and Kucan 2002). Five of these words were emphasized for instruction (Calderón 2005). Following Rupley, Logan, and Nichols’s (1998/1999) recommendation to teach words in sets that are conceptually related, each of the five vocabulary concepts were related to a farm theme. Each was also repeated throughout the video an average of 24 times using signs and an average of 8 times using fingerspelling. Each one was also displayed as print on the screen an average of 15 times throughout the video.

**Measures and Procedures**

I obtained background information (e.g., age of identification of hearing loss, degree of hearing loss, parents’ signing skills) about the children’s families through a parental survey of demographic information. Once the surveys were completed, each teacher and I scheduled the children to view the video three times within one week.

At each of the sites, I went into the classroom to bring the children to the testing/video viewing site to administer a pretest. This was a test developed specifically for this study to measure the children’s receptive vocabulary. Vocabulary included both targeted and nontargeted words that appear in the video. The children had to choose from one of four pictures to identify the picture that matched the signed concept. The test was sent out to ASL experts in the field and tested in a pilot study.

For the pretest, the children were taken individually to a room other than their classroom. I explained to each one that I would be showing them some pictures, signing or fingerspelling a word, and asking them to point to the picture that matched the sign. The child chose first from one of four pictures and then from one of four printed words in English. The children were evaluated to determine how many of the thirty words they were able to identify. After the pretest was completed, I returned the children to their classroom and informed them that they would be returning in a few minutes to watch a video. The teachers were asked not to use any of the vocabulary incorporated into the pre/posttest throughout the week of the video viewing.
Once all of the pretests were completed, I went into the classroom and took the group of children to watch the video in a separate room. In one of the self-contained programs and the residential school, the children sat in a row on the floor in front of the television. In the other two programs, they sat in chairs in front of the television because the TV/VCR cart was too high for them to see from the floor.

Throughout each video viewing, I remained quiet unless one of the children directly asked me a question. When that happened, I generally either redirected the child so as not to give the answer or told the child that we would discuss it at a later time.

Data Analysis

Definitions

Engagement was defined as the degree to which a child physically responds to the video through movement, makes comments, or reacts to the video through facial expression (Crawley et al. 2002). In examining literacy behaviors during the video viewing, I defined these behaviors as acknowledgement of either pictures or print in the video. I included pictures in this category based on Sulzby’s classification scheme (1985). In this video, Peter presents pictures representative of what happened during the outing to the farm. First, he asks the audience to help him sequence the pictures; then they add text to the pictures and place them in a book; finally he reads the whole story. In one segment Peter asks the children in the video, as well as the viewing audience, which picture comes next. I considered it sequencing if the participants were able to point to or mention what picture, word, or sentence they thought would appear next. Story recall was defined as the participants’ mention of characters or events in the story after viewing the video once. Attention to text was defined as any time the children read, pointed to, or discussed the printed text on the screen. Copying dialogue was defined as the participants’ signing exactly what the characters in the video signed. For the purpose of this article, only literacy-related engagement is reported.
Transcription and Coding
In this study I used an extensive descriptive analysis to code the engagement behaviors. Each group of children watched approximately 135 minutes of video. For each group the entire 135 minutes was recorded on a digital camcorder. Each child’s spontaneous signed and spoken conversations were transcribed, and their behaviors were documented according to Gale (2003). Transcription was completed in Microsoft Word and color-coded for the following four categories: pointing to the television screen, signing of a targeted vocabulary word, fingerspelling of a targeted vocabulary word, and conversation related to the video. Additional behaviors and conversations were transcribed but not coded. The categories of conversation related to the video were further broken down into subcategories (story recall, sequencing, and attending to text printed on the screen. I counted literacy-related behaviors in the category of conversation about the video, as well as in the signing or fingerspelling of the targeted vocabulary. Each transcription was separated into Day 1, Day 2, and Day 3, and each coded category was then examined for frequency of occurrence. The totals were entered into a Microsoft Excel database, and the totals of each category were documented as well. The differences between Day 1 and Day 3 were calculated.

Twenty percent of the transcriptions were coded by a second researcher following these same methods. The differences between the two coders were checked for reliability. The original coder counted a total of 324 engagement behaviors, and the reliability coder counted a total of 301, a 97 percent correlation.

Findings
Engagement Behaviors of All Participants
Table 1 presents the coding of three different types of engagement behaviors: signing targeted vocabulary words, conversation about the video, and fingerspelling targeted vocabulary words. It also shows the total within each category and the difference between Day 1 and Day 3.
As table 1 illustrates, a dramatic increase occurred between the first and the third day in the signing of the targeted vocabulary words. This signing increased 287 percent from the first day (70 times) to the third (271 times). Similarly, additional comments showed a 130 percent increase from the first day (291) to the third (669). While the children fingerspelled the targeted vocabulary words less frequently than they signed them, the number of fingerspellings nonetheless increased 170 percent from the first day (20 times) to the third (54 times).

**Pre/Posttest Results**

For the participants, the overall average increase from pretest to posttest was 20 percent. The highest increase was 43 percent (by a five-year-old residential school participant with Deaf parents). Five participants demonstrated more than a 30 percent increase; all of these youngsters were over the age of 4;11, and four of them were from a self-contained program. While the older children from the residential program did not have as high an increase, this could be the due to a ceiling effect as they scored higher on the pretest.

After considering the differences in exposure to ASL, age, and school program attended, I chose four participants who I felt best reflected the variability of the participants in this study: Maria, Greg, Gary, and Ella. Two of these children were from the residential program that used ASL as a means of instruction, and the other two were from two different self-contained programs, both of which subscribed to the Total Communication philosophy. The two children

<table>
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<tr>
<th>Types of Engagement</th>
<th>Day 1</th>
<th>Day 2</th>
<th>Day 3</th>
<th>Difference Day 1 to 3</th>
<th>Percent Increase Day 1 to 3</th>
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<tbody>
<tr>
<td><strong>Signing</strong></td>
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<td></td>
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<tr>
<td>targeted vocabulary</td>
<td>70</td>
<td>157</td>
<td>271</td>
<td>201</td>
<td>287%</td>
</tr>
<tr>
<td><em>Comments</em></td>
<td>291</td>
<td>426</td>
<td>669</td>
<td>378</td>
<td>130%</td>
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<td><strong>Fingerspelling</strong></td>
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<td>targeted vocabulary</td>
<td>20</td>
<td>14</td>
<td>54</td>
<td>34</td>
<td>170%</td>
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Note. *Refers to categories that included some literacy related behaviors. **Refers to categories in which all behaviors were literacy related.
who attended the residential school both have Deaf parents, while the other two have hearing parents.

*Maria*

Maria attended one of the self-contained preschool classrooms. She was four years old and eleven months at the time of the study and, according to her parents, has a severe-to-profound loss and wears hearing aids. Her parents reported that they had been studying sign language for one year and use Total Communication as their primary means of communication. They considered themselves to be intermediate signers.

My first impression of Maria was that she was a shy and quiet child. She followed me to the testing site with a smile on her face but without signing a word. On the first day she did not display any engagement behaviors such as signing along or copying movements.

During the second video viewing, she exhibited several engagement behaviors related to emergent literacy. For example, during the beginning segment of the video, when the vocabulary was introduced, Maria signed one of the targeted vocabulary words, PUMPKIN. While this was the only time she signed a vocabulary concept, she signed it continuously for approximately twenty seconds. She also signed two nontargeted vocabulary items: GAME and STORY. Signing these two concepts reflected her ability to recall what would happen in the video. In one segment of the video the characters play a word game. Maria signed GAME right before the word game was going to start. She signed it with an excited smile. She also signed STORY right before the storytelling portion of the video was going to take place. Again she smiled and was excited while she signed.

Maria exhibited a dramatic increase in her engagement behaviors on the third day compared with the first day. Again, many of these behaviors were literacy related. She signed targeted vocabulary twenty-four times as opposed to none the first day and one the second day. In addition to the targeted vocabulary, she also talked about other events in the video fifteen times. Similarly to Day 2, she signed GAME and STORY before each of these segments occurred. This was the first day that she fingerspelled words in addition to signing them. She fingerspelled the targeted vocabulary words “flower,” “farm,” and “corn” once each.
Maria had the second highest increase from her pretest score to her posttest score on the vocabulary test. On her pretest she scored 16 out of 30, or 53 percent. On her posttest she scored 27 out of 30, or 90 percent. The increase was 37 percent, which was 17 percent above the average of the other participants.

Greg

Greg was 5;10 at the time of the video viewings. He has a severe-to-profound loss, but his teacher informed me that he had just received a cochlear implant. He attended one of the other self-contained preschool classrooms. His parents are hearing but have received a variety of intervention services including sign language lessons (Total Communication), learning strategies for reading with their children, audiology, and speech.

Throughout the three days, Greg appeared to really enjoy the video. He was very energetic. Not only did he engage in the video, but his engagement behaviors influenced the other two boys in his group. He did not sign or fingerspell any of the targeted vocabulary words, but he commented thirty-four times. Most of his comments were spoken rather than signed. Some of the comments he made on the first day were related to the characters in the video: “There’s Peter,” “She’s sleeping,” “That’s a raccoon,” “She’s funny,” and “The raccoon was wrong going to the pumpkins and getting one.” Some of the comments reflected literacy skills such as predicting what would happen in the story: “Will they have pumpkin pie when they get home? I think some kids will.” He also read the sentences, for example, “It says, ‘We arrived at the farm.’”

During the second video viewing, his comments increased substantially—from 34 comments to 100. Greg’s behaviors related to literacy increased on Day 2. While on the first day he did not sign any of the targeted vocabulary words, he signed them twenty-five times and fingerspelled them five times on the second day.

In addition to signing and fingerspelling the targeted vocabulary, he exhibited other literacy-related behaviors such as predicting skills and attention to text. His comments related to story prediction also increased. For example, “Which one do you think it’s going to be? I think it’s flower. Which one do you think, Michael? Flower, tractor,
or corn?” and “We’re going to jump in the sky when we get there.” Greg also continued to read the sentences during the segment during which the characters make the book. He read all six sentences and also read the words on the cards during the word game.

On the second day, Greg asked me whether he could act out the video. I said, “Yes.” This was the only group that attempted to act out the full video. Not only did he want to act it out, but he also encouraged the other children to do so as well. Some of the comments he made to them were “Come on, Michael, get a pumpkin very fast. Get a pumpkin very fast!” “You guys jump,” “I want to be the girl,” and “I want to be the boy.”

During the third video viewing, he signed targeted vocabulary words twenty-seven times and fingerspelled targeted words seven times. Similarly to Day 2, Greg asked whether he could act out the video again. His comments reflected this as most of them were direct imitations of the dialogue in the video. Aside from that, his comments were similar to those on Day 2. Toward the end of the video, he asked the other children to turn their chairs around and act like pumpkins. He got very upset and started crying when one of the other boys did not want to. After that he stopped engaging in the video.

Greg scored 23/30 on his pretest (83 percent) and 29/30 on the posttest (97 percent). His increase from pre- to posttest scores was 14 percent.

Elisa

Elisa was one of the oldest of the participants that I tested from the residential group. She was 6;8 at the time of the testing. Elisa has Deaf parents and attends a residential school for Deaf children. She has been exposed to ASL from birth both at home and at school. Elisa has a profound hearing loss.

On the first day, Elisa signed the targeted vocabulary words twice and fingerspelled them six times. She made twenty-two comments about the video on the first day. Elisa’s behaviors indicated her interest in literacy as she especially engaged with print in the video. At one point, she pointed to the sentence “We ate corn,” waved to me, and signed that it was wrong. She fingerspelled the word “ate” and laughed
and signed that it should be “eat.” She also read all of the sentences during the storytelling portion.

On the second day, her engagement behaviors increased. Her comments reflected an understanding of literacy elements in the story, such as recalling important events and characters. For example, she mentioned that they would eat corn with the leaves on it. She also told one of the other boys what would happen next: YOU KNOW BELVA, PT-SHE PUSH_HAY FOR FOR HELP_HER and YOU KNOW KID NEXT PETER, PT-SHE LAST. She read the sentences again and signed the sentence about eating the corn correctly as WE EAT FINISH CORN. She also named all of the characters by their name signs.

On the third day, similarly to Day 2, she exhibited engagement behaviors related to literacy such as attending to print, story recall, and sequencing. For example, she read all of the sentences when Peter made the book. She also acknowledged a printed sign in the video, “PETER’S PLACE.” She was the only child who did this. During the word game she told everyone which child would be next.

Elisa had one of the highest pretest scores: 20/30 (67 percent), and her posttest score was 28/30 (93 percent), an increase of 26 percent.

Gary
Gary was one of the youngest children that I tested. He was 3;3 at the time of the study. He comes from a Deaf family and attends a residential school for Deaf children. He has been exposed to ASL from birth both at home and at school. He wears hearing aids and has a moderate loss.

On Day 1 he signed targeted vocabulary words twice and signed fifteen comments about the video. Gary’s literacy-related behaviors included acknowledgement of characters and recognition that print has meaning. At the beginning of the viewing, he signed RABBIT, which is what he called Rika’s character. During the making of the book section, he turned to me and signed WRITE WHAT? asking me what they were writing. He smiled a lot and got really excited at certain parts, especially during the word game. Most of his comments during this segment were labels of colors in the game. In this group the children were sitting on a rug, and when he saw a color on the card, he would jump up and sign GREEN! very excitedly.
During the second video viewing, Gary signed targeted vocabulary words six times and made eighteen additional comments related to the video. He seemed to be most interested in Rika’s character (still calling her a rabbit), which he commented on several times, pointing (PT) to the screen frequently and signing PT RABBIT, PT RABBIT, WAKE UP RABBIT. Later he signed RABBIT again. During the second day he also copied the “rabbit” character when she made the gesture of smelling a flower. As on Day 1, most of his comments came during the word game, when he signed the colors of the cards. Again he jumped up and signed the colors with great enthusiasm.

On the third day, his engagement behaviors increased dramatically. While he had signed targeted vocabulary words only twice on Day 1 and six times on Day 2, he signed them twelve times on Day 3. His comments also more than doubled—from eighteen on Day 2 to forty-five on Day 3. His behaviors related to literacy included talking about the characters and acknowledging the events in the story. While he commented on the rabbit character again, his comments expanded to PT, PT RABBIT, PT RABBIT WHERE? THERE RABBIT THERE WAKE UP! During the sequencing of pictures, he also pointed and signed RIGHT several times, acknowledging that the correct picture was chosen. Again during the word game, he named all of the colors.

Of particular interest was his posttest score. Considering that he was the youngest participant, Gary had a fairly high increase from his pretest to his posttest. He scored 7/30 on the pretest (23 percent) and 14/30 (47 percent) on the posttest. His increase in posttest scores (24 percent) was also reflected by the increase in the number of times he signed the targeted words. As previously mentioned, on Day 1 he signed targeted vocabulary words two times, on Day 2 six times, and on Day 3 twelve times.

Discussion

The purpose of this study was to examine the types and the frequency of literacy-related behaviors that preschool deaf children would engage in while viewing an educational video in American Sign Language. The results indicate that deaf children between the ages of three and six years will engage in literacy-related behaviors such as
story recall, sequencing, signing and fingerspelling targeted vocabulary, and attending to text printed on the screen. In addition, the study shows that these behaviors increased after watching the video multiple times, which reflects an increase in the children’s comprehension (Anderson and Lorch 1983).

The student profiles reflect the variability among the participants in ASL exposure, age, and engagement behaviors. Even though there were many differences among these children, their profiles clearly show that they all enjoyed interacting with the video. Their engagement behaviors also reflect the variability in their literacy skills. Whether it was acknowledging that print had meaning, signing or fingerspelling a targeted vocabulary word, or reading a full sentence, each of these children interacted with print in one way or another. Many of them also sequenced pictures, pointed to text, or discussed characters or events in the story.

Both the positive correlation between ASL and reading skills (e.g., Padden and Ramsey 1998; Prinz and Strong 1998; Singleton et al. 1998) and the fact that even children with minimal exposure to ASL engaged in this video regardless of age reveal that these types of videos could be a beneficial tool for preschool DCHP, who frequently come to school with limited exposure to language and literacy.

The results of this study align with an emergent literacy perspective on showing preschool children both languages (ASL and printed English) simultaneously (Teale and Sulzby 1989; Sulzby and Teale 1991) and support Williams’s (2004) discussion that deaf children can benefit from being exposed to both language and literacy. Both parents and educators could use this video in the home and/or at school in a variety of situations to foster engagement in language, literacy, and cultural activities essential to deaf children’s identity development and education.

Limitations

As with many studies that involve deaf children, the sample size is small. It would be ideal to repeat this study with a larger number of participants because this would allow for in-depth statistical analyses to determine whether significant differences exist between groups ac-
cording to parental hearing status or exposure to ASL. A larger sample would also allow for a comparison of groups who view the video in the home and those who see it at school.

In addition, while I analyzed engagement behaviors, I did not analyze interaction between children. It is possible that the children positively and negatively affected other participants’ engagement behaviors.

Implications for Future Practice

The results of this study potentially provide both teachers and parents with a new medium of instruction with which to enhance deaf children’s emergent literacy skills. The participants in this study varied in their educational programs, hearing loss, and exposure to ASL. This study reveals that even when children have limited exposure to ASL, they will still engage in an educational video in ASL (with no sound).

For deaf children with hearing parents, this is particularly informative. It takes time for hearing families to learn to sign. These children could benefit from watching the video by themselves in their homes by being exposed to English print through ASL while their families are learning to sign. They could also benefit from watching the video with other family members in the hope that it would maximize the children’s learning and simultaneously help families improve their ASL skills.

According to research on *Between the Lions* (Linebarger 2000; Loeterman, Paul, and Donahue 2002), children learned more when the teachers interacted with them during video viewing and provided supplementary activities than when the children watched the video by themselves. If adults interact with the children by encouraging them to sign along or asking them questions about the print, there might be an increase in engagement behaviors, which could also facilitate learning.

Implications for Future Research

Multiple possibilities exist for future research. For example, an increasing body of research reveals that Deaf adults use different approaches to help children make connections between ASL and English print (Akamatsu and Andrews 1993; Padden and Ramsey 1998; Andrews
This study suggests that these same strategies can produce positive results in the medium of video and can be further analyzed by examining the amount of time each targeted vocabulary word appears versus the levels of difficulty of signed, fingerspelled, and printed vocabulary. While vocabulary was targeted in the current curriculum, other essential components of emergent literacy could also be targeted and assessed in future videos, including book and print knowledge, letter knowledge, and sequencing and comprehension skills.

It would also be informative to repeat this study with hearing children because it would allow for a greater sample size and for a design that could include a control group. If this medium were found to be effective with hearing children, not only could it benefit the development of literacy skills in hearing children, but it could also foster cross-cultural understanding and appreciation of bilingualism in Deaf education through a visual-gestural modality.

Conducting case studies of a variety of deaf and hearing participants viewing educational videos both at home and at school would also allow for more in-depth analysis of literacy-related engagement behaviors and the development of emergent literacy skills based on children’s ASL ability, literacy level, and age. In addition, as previously mentioned, I have not yet analyzed the current data for interactions between children during video viewing. Understanding how youngsters influence each other during this activity would help educators create more effective learning environments.

There is a great need for research related to preschool deaf children, literacy, and educational television. This study is a step toward beginning to fill one of those gaps. There are unlimited possibilities for educational videos in ASL, a medium that could be a beneficial, supplemental tool in the development of preschool deaf children’s ASL and emergent literacy skills.

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### Appendix A. Participant Characteristics

<table>
<thead>
<tr>
<th>Name</th>
<th>Parental Hearing Status</th>
<th>Age at Time of Study</th>
<th>Program Attended</th>
<th>Parental Age</th>
<th>Years Parents Communication in the Home</th>
<th>Mode of Child's Communication in the Home</th>
<th>Child's Hearing Loss</th>
<th>Child's Use of Aids</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greg</td>
<td>DOH</td>
<td>5;10</td>
<td>self-contained</td>
<td>M</td>
<td>5.5</td>
<td>speak/sign same time</td>
<td>severe-profound</td>
<td>hearing aids, CI</td>
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<tr>
<td>Mark</td>
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<td>4;8</td>
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<td>M</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
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<td>self-contained</td>
<td>M</td>
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<td>moderate-severe</td>
<td>hearing aids</td>
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<td>5</td>
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<td>profound-moderate</td>
<td>hearing aids</td>
</tr>
<tr>
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<td>profound</td>
<td>hearing aids/CI</td>
</tr>
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<td>self-contained</td>
<td>M</td>
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<td>moderate</td>
<td>hearing aids</td>
</tr>
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<td>4</td>
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<td>hearing aids</td>
</tr>
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<td>self-contained</td>
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<td>severe-profound</td>
<td>hearing aids</td>
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<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
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<td>profound</td>
<td>CI</td>
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<tr>
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<td>hearing aids</td>
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<td>Gary</td>
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<td>DOH</td>
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<td>self-contained</td>
<td>M</td>
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<td>CI</td>
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<td>6;10</td>
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<td>severe-profound</td>
<td>no</td>
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</table>

*Note: DOD = Deaf children with Deaf parents; DOH = Deaf children with hearing parents; CI = cochlear implant*