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The Impact of Early Exposure to Uncontracted Braille Reading on Students with Visual Impairments

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Abstract: This study compared the reading and spelling skills of students who were taught to read using uncontracted braille versus those who were taught to read using contracted braille. It found no descriptive differences between initial instruction in the two types of braille.

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Most teachers of young children who are blind introduce braille contractions early in the process of teaching reading, even though there is little evidence to support the effectiveness of this practice (Ashcroft, 1960; Harley, 1969). Although contractions were not

consistently used for early readers in the early 1900s, the advantages of saving space and the assumption that contracted braille increases reading speed caused a shift toward contracted braille by the 1950s. By the 1950s, the production of materials in uncontracted braille was generally eliminated, and books for early reading instruction were limited to those that used contracted braille, in contrast with the previous practice of providing reading primers in uncontracted braille or in grade 1½ braille with limited contractions (Irwin, 1955).

Whether the early use of contractions enhances reading skills has recently received attention as a result of a Canadian study by Troughton (1992), which found that a small group of blind students who learned contractions later in their school years had superior reading skills to those who learned contractions early. The debate over when to introduce contractions has been fueled by the emergence of technologies that make it possible to produce brailled materials with selected contractions and by the decreasing importance of saving space as more materials are stored electronically instead of on paper. This article presents an investigation of the reading abilities and experiences of students who were introduced to contractions from the beginning of reading instruction compared to students who learned contractions after they could read efficiently in uncontracted braille.

Review of the literature

Few studies have compared the early and later introduction of contractions; the early introduction of contracted braille has been assumed to be superior on the basis of professional observations. One reason why contracted braille is introduced early may be the assumption that less space is needed for contracted materials. Kederis, Siems, and Hayes (1965) reported that 26.5% of the space could be saved by using contracted braille instead of uncontracted braille. Durre (1996) investigated space saved in a random selection of 39,717 words and found that contracted braille took up to 20.42% less space than did print. In her study, the top-ranked 100 contractions contributed to 95% of the total space that was saved.

It is questionable whether saving space is a sufficient reason to support the use of contracted braille without a consideration of the possible advantages of uncontracted braille. Children's books, including textbooks, are thinner than are those that are used for older students and adults. Some books for young readers include tactilely adapted drawings and large amounts of empty space to allow pages to correspond with printed texts. As a result, the actual reduction of the size of books or materials that are used to produce the books may not be as significant as was originally perceived. The value of simplifying the code for young readers so that time can be spent learning to read may outweigh the practicality of saving a small amount of space.

Ashcroft's (1960) investigation of oral reading errors among students with visual impairments (that is, those who are blind or have low vision) found that orthographic errors were the most common types of errors and that most of them were associated with contractions. Ashcroft recommended reducing the number of uses and meanings that are assigned to contractions, using more cues for the recognition of short-form words, decreasing the variability at the ends of words, and including more alphabetic and phonetic logic in contractions. Although Ashcroft acknowledged the space-saving advantages of contracted braille, he stated that many infrequently used words did not save a lot of space and were the reason for frequent errors and suggested that some braille codes might have to be reconsidered. His study indicated that contracted braille was associated with error patterns, not all of which were efficient for saving space.

Reading rates are a relevant consideration because of the belief that contractions increase the reading speed of braille readers. Reading rates that have been reported in studies of braille readers have varied widely. Early studies of braille reading speeds reported oral reading speeds of about 90 words per minute (WPM) (Nolan & Kederis, 1969), with means of 116 WPM for students in residential schools and 149 WPM for students in public schools (Lowenfeld, Abel, & Hatlen, 1969). Foulke (1991) reported oral reading speeds of 65–76 WPM at the junior high school level

and 80–90 WPM at the senior high school level. Few studies have considered the introduction and use of contractions in relation to the reading speeds of students with visual impairments. In their study of the relationship between the number of contractions and reading speed, Lorimer and Tobin (1979) identified four combinations of braille contractions. Three combinations included reduced numbers of contractions, and one expanded the code to include a variety of new contractions that Lorimer and Tobin created and taught to the participants. The findings suggested that the reduction of contractions in codes did not affect students' reading speeds, but an expanded code lowered the reading rates.

In a 1982 position statement, Nilsson (1982) described the advantages of uncontracted braille, stating that research on the effects of contractions often included material that presented uncontracted braille in passages that normally included contractions. Nilsson stated that a more valid measure of reading with uncontracted braille would be to include only words that are not typically contracted.

Troughton (1992) followed this recommendation in her study of differences in reading speeds with materials that contained contractions with those that contained no contractions. She found that 113 of the 125 participants read more rapidly in uncontracted braille, whereas only 11 participants read more rapidly in contracted braille. The participants represented about

90% of the braille readers in Ontario, Canada, and ranged in age from 6.6 to 70.9 years; about 75% of them were congenitally blind. Troughton concluded that people with visual impairments can read more rapidly when the text contains only uncontracted braille than when it contains contracted braille.

These studies suggest that contracted braille may yield a slower reading speed than uncontracted braille and that uncontracted braille does not decrease the reading speeds of persons with visual impairments. This conclusion is unexpected because one of the two most compelling reasons to use contracted braille is its potential to improve a person's reading speed. When considered with studies that have found a limited reduction of space with the use of contracted braille, research on reading speeds has pointed to the critical need for studies to determine the influence of contractions on reading skills, especially during the early years when children must develop efficient general reading skills.

Method

To explore the effects of introducing contractions on reading skills, we conducted a study that applied a matched-subject design to compare the reading skills of eight students who were introduced to contractions from the time they began reading with the reading skills of students who learned contractions after they mastered reading. In addition, a qualitative component

of the study involved interviews with five students who had learned to read in uncontracted braille and five teachers who had taught students using this method. A convenience sample was necessary because there are few students who have learned contractions after they have learned to read and few teachers who have conducted early braille instruction using this method. The research questions that guided this study were as follows:

1. Are there differences between the reading speeds of students who learned contracted braille early in the reading-instruction process and those who learned contracted braille later?

2. Are there differences in the types and frequencies of spelling/braille errors of students who learned contracted braille early in the reading-instruction process and those who learned contracted braille later?

3. Are there differences in the comprehension levels of students who learned contracted braille early in the reading-instruction process and those who learned contracted braille later?

4. Are there differences in the word recognition skills of students who learned contracted braille early in the reading-instruction process and those who learned contracted braille later?

5. What are the remembered reading experiences of braille readers who learned contracted braille later

in the reading-instruction process?

6. What are the reasons that teachers choose to teach uncontracted braille for students in the first grade?

Participants

The participants were recruited between March and December 2001, mainly through contacts from mailed requests to possible candidates who were selected from a 1998 survey on uncontracted braille that was conducted by the American Printing House for the Blind (APH; Pester, 1998). From the APH survey, we identified teachers who indicated that they taught uncontracted braille to students with visual impairments and contacted 328 of them by mail to request contacts with their students who had learned uncontracted braille. Fifty-nine of these teachers responded, and each was contacted via e-mail or telephone to determine whether they had contact with students who had read uncontracted braille for more than one year before they learned contractions. Many of the respondents were serving students who received special education services for disabilities in addition to visual impairments, who did not meet the study's criteria. In addition, the study was advertised in newsletters, on electronic discussion groups, and at professional conferences. Twenty-two respondents were identified as appropriate candidates for this study, and 10 of them completed the consent forms for participation.

Students who learned braille contractions early were recruited to match the uncontracted braille group. The students were matched on four variables: school setting (public school or specialized school), gender, reading level reported on their Individualized Education Programs, and chronological age. We mailed 320 packets about the need for matching subjects to teachers who were members of Division 16: Itinerant Teachers of the Association for Education and Rehabilitation of the Blind and Visually Impaired. In addition, several messages were distributed via electronic discussion groups and agency contacts. As a result, 19 teachers indicated that they had students who could be matched with the previously identified students who had learned uncontracted braille. Although a match was identified for the 10 students in the uncontracted braille group, 1 student later decided not to participate in this study and another student's family did not agree to participate. As a result, only 8 student pairs were available for the study.

All the uncontracted braille readers who indicated their willingness to participate in the quantitative portion of the study were asked to participate in individual interviews as well. Two students who participated in the quantitative study also participated in the qualitative portion, and three other students who began reading in uncontracted braille agreed to be interviewed.

We also contacted five teachers who had taught

uncontracted braille to their students in the early stage of learning. Of these five, three participated in the quantitative portion of the study by administering the tests to their students, and two did not currently have any students who had learned uncontracted braille early.

The uncontracted-braille group (UBG) and the contracted-braille group (CBG) each included 8 students whose primary reading medium was braille. Of the 16 students, 14 (87.5%) attended regular classrooms or resource rooms in public schools, and 2 (12.5%) attended residential schools. Demographic information of the UBG and CBG are presented in Tables 1 and 2, respectively.

The five teachers (all women) who participated in the interviews had a mean of 18.8 years of teaching experience and had master's degrees in special education. All were teaching in public schools, and one teacher indicated that she had also worked at a residential school. The mean number of students for whom four teachers had provided braille instruction during their careers was 27.75; one teacher could not recall how many students she had taught braille to.

The mean age of the five students (two boys and three girls) who participated in the interviews was 13.2 years. Four students were attending school, and one had graduated from high school.

Procedures

Quantitative

The first four research questions were addressed by analyzing the quantitative data. Johns's *Basic Reading Inventory* (BRI; 1997, 2001) was used to gather data about the students' reading abilities with regard to speed, comprehension, and miscues. The BRI was chosen because passages that were used in the test had been selected from existing reading materials, ensuring coverage of a wide range of materials (Pikulski, 1990). In addition, it was assumed that many teachers of students with visual impairments would be familiar with the BRI because it had been used as part of a learning media assessment (Koenig & Holbrook, 1995). Students' independent writing samples were collected for analyses of braille errors. The Spelling/ Braille Error Analysis (Koenig, 1987) was used to examine these samples and to distinguish spelling errors from errors that were associated only with braille.

To measure reading speed, we asked the participants to read a graded passage of a level corresponding to the independent reading level as measured by the graded word list of the BRI (Johns, 1997, 2001). The reading speeds of the UBG and CBG were compared by descriptively analyzing the data.

To measure the students' spelling errors, we used

samples of their writing. Because of differences in the length of writing samples, we changed the number of errors indexed by Koenig (1987)'s Spelling/Braille Error Analysis to a percentage rate of the total number of words in the samples to measure the types and frequencies of spelling/braille errors of the UBG and CBG. Both spelling errors and braille errors were analyzed. Spelling errors included homonym errors related to braille contractions, unsuccessful attempts at full spellings of contractions, and so on. In contrast, braille errors included character-level errors, word-level contraction errors, interword-level errors, and miscellaneous braille-related errors.

Two measures were used to determine differences in the UBG's and CBG's levels of comprehension: the number of comprehension questions that the students missed and their grade levels of independent reading indexed by the graded word list that was administered. The students who read at the third- to the eighth-grade level were asked to answer 10 questions after they read the graded passage, and those who read at lower grade levels were asked to answer 5 questions. The number of wrong answers from the students who read at the lower grade levels was adjusted to compare equally with the rest of the students' results by multiplying by 2. Using graded word lists, we identified the students' independent reading levels. The independent reading level is reached when a student responds accurately to 19 or 20 words out of 20.

We used two measures to determine the UBG's and CBG's word-recognition skills: the number of correct words on a graded word list and significant miscues for graded passages. First, the students were asked to read a set of 20 words. Then the number of correct words and the number of miscues was recorded and analyzed, and significant miscues from the oral reading of graded passages were used to compare the two groups' word-recognition skills.

Qualitative

Ten interviews were conducted to provide an understanding of the students' personal experiences with early instruction in uncontracted braille and the teachers' reasons for teaching uncontracted braille. An interview protocol was developed for the study; the guiding questions were developed by consulting with professionals in the field, teachers of students with visual impairments, and users of braille. While collecting data, we added questions that were essential to the topic on the basis of the feedback from the participants. Therefore, the interview protocol was continually expanded throughout the interview phase of the study. Interviews were audiotaped and transcribed for analysis. Five interviews were conducted with students who had learned to read in uncontracted braille, two of whom also participated in the quantitative analysis. In addition, five interviews were conducted with teachers who also participated in the quantitative analysis.

Results

Quantitative

Reading speed. The mean reading speed of the UBG (*N* = 8) was 60.5 WPM (*SD* = 28.25) and that of the CBG (*N* = 8) was 60.0 WPM (*SD* = 23.59). The standard deviations of the two groups were large because the students represented a wide range of grade levels. No considerable differences in reading speeds were observed between the two groups.

Spelling. The mean percentages of spelling errors were 5.67% (*SD* = 9.39) for the UBG and 3.54% (*SD* = 5.06) for the CBG. The mean braille error percentages of the UBG and the CBG were 4.75% (*SD* = 2.025) and 4.36% (*SD* = 2.07), respectively. The frequencies of spelling errors by the UBG and the CBG were in the same range. In addition, no substantial divergence was found between the percentage of braille errors, indicating that the frequencies of braille errors by the UBG and the CBG were in an equivalent range. Both groups exhibited similar types of spelling errors and braille errors, and the frequencies of such errors were not different.

Reading comprehension. The mean numbers of questions missed by the UBG and the CBG were 1.50 (*SD* = 1.43) and 1.94 (*SD* = 1.76), respectively. There was little discrepancy between the mean

numbers of questions missed by the two groups. The mean independent grade levels were 5.25 (*SD* = 3.45) for the UBG and 4.12 (*SD* = 3.34) for the CBG. Neither uncontracted braille nor contracted braille yielded higher or lower comprehension scores, but the UBG, using materials that were one grade level higher, read as well as the CBG.

Word recognition. The mean numbers of words pronounced correctly were 19.50 for the UBG (*SD* = .756) and 19.37 (*SD* = .517) for the CBG. Both groups performed competitively in this area. The mean numbers of miscues were .87 (*SD* = .83) for the UBG and 2.12 (*SD* = 3.04) for the CBG. The two groups did not show a large discrepancy in the number of miscues in oral reading. Both groups demonstrated a similar level of word-recognition skills, and the difference in reading medium did not affect the students' performance in this area.

Qualitative

Interviews with the teachers

The five teachers reported that the two main sources of information about teaching uncontracted braille were the braille-related courses they took to obtain their academic degrees and networking with other professionals. When asked how they decided which students to teach using uncontracted braille, three teachers stated that the presence of additional

disabilities was the most important reason, and two teachers mentioned the development of phonetic skills and the importance of family support.

One teacher who had taught uncontracted braille to students who had disabilities in addition to visual impairments described teaching braille to a blind student who had a learning disability. She said, "If [we told] him that here's a word that we know is 10 letters long or 8 letters long, but we can contract it into one, it confused him." Another teacher considered uncontracted braille for her student because the student had a traumatic brain injury and might not become a fully academic reader.

One teacher stated that family support, which is important for early readers, could be impeded by the use of contracted braille for beginners. She said:

> While I was doing volunteer brailling for the state library, I was brailling books for children. Since I always took my [own] children to the library by the time they were 3 years old and read to them while they looked at the words, I was thinking about how parents of blind children would introduce the letters of the alphabet to their children. The library only wanted the books brailled with contractions, and it didn't make sense to me.

Another said:

> You know, if [the visually impaired children] are going to learn their language arts in the regular classroom with their typically sighted peers, then that can be particularly difficult for a regular teacher if the [children are] not using

> grade 1 braille because the [children] can't help them make that connection between the two as easily.

On the other hand, phonetic consistency was considered a motivation for selecting uncontracted braille; as one teacher put it, "I think part of it is developing their skills of phonics, learning the sounds of letters and how to put letters together into words." Contracted braille combines several characters into one code, and it may hinder students' ability to use the sounds of characters as cues for reading, as this teacher noted:

> It would be more important for me that the students are getting that letter-sound correspondence and that they are making approximations based on letter sounds— they've seen this word before, and they kind of remember what it's spelled like and what it looks like—and build the code up from where a child is starting.

One teacher said that contracted braille may prevent students from exploring contextual cues that are essential for reading, especially from the point of view of whole language:

> I've also seen a lot of braille students who don't really understand the difference between what a character is and what a letter is. You ask them what the last character of a word is, and they say "e r" because it ends in "er." So I think that it's an important distinction, especially with doing any type of handwriting, computer work, typing, that sort of thing.

The next question was whether uncontracted braille was helpful in the area of reading for all students with

visual impairments. There were some discrepancies among the teachers in their answers to this question. However, the primary response was that teachers should fully account for the individual needs of students before they make a decision. Only one teacher believed that every student should be taught in uncontracted braille. "I do not begin with alphabet braille for every student. All the students learn the alphabet, but from there a choice must be made." The variables that the teachers recognized as important factors were age, visual status, previous knowledge of print, the availability of materials, and additional disabilities. As one teacher noted:

> One thing I would consider would be the age of the student. If it's a young student—a preschooler, kindergartner, or first grader—I would probably start with grade 1 braille, so the student could be developing all those basic language literacy, phonics skills along with [his or her] other peers. If it's an older student, I'd probably be less likely to do it...because I think [the student] would have some of those basic concepts.

Two teachers explained that the availability of materials was an important issue to consider and that the lack of materials might discourage the use of uncontracted braille for continued reading instruction. As one teacher put it, "My frustration over the years has been that the only materials available were in contracted braille and that there was real opposition to any suggestion that uncontracted braille [could] be used for younger students, especially if they were very bright." In addition, three teachers expressed concerns

about the use of contracted braille and keyboarding skills, which is considered an important academic factor for students with visual impairments, as the following comment illustrates:

> I believe that when you begin with alphabet braille and students understand how words are spelled, it is easier to make the transition to keyboarding on the computer. You just explain to the students that in keyboarding, they use alphabet braille. There is no dot five on a computer keyboard.

Three teachers did not report differences in interactions between students with visual impairments and their sighted peers because of the use of uncontracted braille. However, four teachers believed that the use of uncontracted braille was helpful for collaboration with classroom teachers because students with visual impairments could obtain prompter feedback from their classroom teachers. Two typical comments were these: "Definitely [the use of uncontracted braille would help students work] with their teachers. It gave them a much better chance to receive instructions from their teachers when I wasn't there. It helped make the student and the teacher much more comfortable." "Classroom teachers are much more able to understand a paragraph when the braille has one-on-one correspondence to the print alphabet."

The parents of the students did not hold as strong positions on this topic as did the teachers, although they did not object to the use of uncontracted braille

when enough explanation was given. One teacher noted that the terms *grade 1 braille* and *grade 2 braille* were misleading to parents. She stated: "One of the biggest problems is the label *grade 1* and *grade 2 braille,* which makes people think that if the children are not immediately put in grade 2, they are being held back."

Interviews with the students

Four of the five students reported that they learned braille in preschool, and one student had learned it in the first grade. As one student said:

> I kind of learned it over the years. I didn't learn it all at once. It was kind of like, I started with my name. Like in preschool, I already knew how to read my name, and I was trying to type it, too.

Once the students began learning braille, the next step was to transition to the stage of contracted braille. Two students were transferred to contracted braille at the end of the first grade, and three students started learning contracted braille between the last semester of the second grade and the beginning of the third grade. As they made the transition, the students had to understand contractions and the rules associated with contracted braille. Two students said that it took two years for them to learn all the contractions, one said it took one year, one said it took five months, and one did not recall how long it took; however, the students' recollections of this information may make the

responses unreliable. In one case, a student indicated that it took six months to learn all the contractions, but her teacher reported that it took her two years to do so.

The students were also asked to describe the reasons they like uncontracted or contracted braille. All five students discussed the appealing points of contracted braille, and two students believed that uncontracted braille contributed to their spelling skills. As one student put it:

> I know that learning grade 1 [braille] first helped me to learn how to spell. And instead of just putting an L for "like," you know, you had to spell it out. Because it's not enough to know.... I mean, in this world, you have to know how to spell.

Another student argued that the simplicity of uncontracted braille could be considered an advantage.

With regard to the advantages of contracted braille, four students noted that it takes less space than does uncontracted braille. They also stated that contracted braille is a faster reading and writing medium than is uncontracted braille. As one student said: "The grade 2 braille...is much faster than grade 1 because [with] grade 1... you have to write out all the letters."

The students were asked about their parents' participation in their early braille reading experiences. Two students' parents were braille readers who were fluent in contracted braille, two students' parents

attempted to learn braille, and one student's mother was trying to learn braille but was not successful. The latter student said, "Well, my mom is trying to learn. But, you know, no one really knows. They just know the basic letters, like I have an ABC chart, but that's basically it. Just the basic stuff." On the other hand, another student indicated that his father could read all alphabet signs. "My dad started learning it when I was learning it. He did pretty good. It was just grade 1. And then he didn't have the time after that." The family of the fifth student, who spoke Spanish as their primary language, did not learn any braille. Although the parents' experiences varied, the fact that the two parents who read uncontracted braille had not attempted to learn contractions suggests that skills in uncontracted braille are more attainable.

Discussion

The quantitative data that compared the reading abilities of the students who learned to read in contracted and uncontracted braille showed few differences between the two groups, suggesting that there was no effect of the two methods with this sample. With regard to reading speed, the means of the two groups were virtually identical, with the UBG reading an average of 60.5 WPM and the CBG reading an average of 60 WPM. For the UBG, early learning of uncontracted braille did not increase or decrease their average reading speed.

Although this finding seems to contradict the findings of previous studies of the speed advantages of contracted braille, the study actually addressed a different issue—the long-term effects of instruction in early braille, not the comparison of the speeds of experienced readers with materials in contracted and uncontracted formats. Although the results are different from those of Troughton (1992), who found higher reading speeds for students who had been taught uncontracted braille, they also do not support the commonly held view that changing to contracted braille later in school will impede the speed and efficiency of reading.

In addition, there were no significant differences between the UBG and the CBG in spelling errors. The UBG had more frequent total errors, but the high standard deviation (9.395 compared to 5.06 for the UBG) suggests that the total means may have been affected by one or two students who had unusual difficulty with spelling. The participants showed similar errors to those described by Koenig and Ashcroft (1993). It is interesting to note that the UBG had fewer errors at the character level than did the CBG. The types of errors in this category occur mostly by chance instead of intention, according to Koenig and Ashcroft; therefore, it is possible that students who read uncontracted braille may have better control over unintentional errors.

With regard to comprehension, no substantial

difference was found between the UBG and the CBG as measured by the number of questions missed. The mean grade level of independent reading for the UBG was higher (5.25) than for the CBG (4.12). In other words, the UBG exhibited a similar level of comprehension as did the CBG but at a reading level that was one grade level higher than the CBG.

Furthermore, the two groups of participants did not show any differences in word recognition. When tested for word recognition in context and out of context, the groups were similar. The literature on early reading emphasizes the importance of efficient word recognition, both with typical readers (Chard & Osborn, 1999; Cunningham & Stanovich, 1998; Stanovich, 1986) and with braille readers (Wormsley and D'Andrea, 1997). It seems logical that uncontracted braille, which has more one-to-one correspondences between symbols and sounds, would facilitate word recognition. However, contractions, such as *sh*, *th,* and *ch,* that represent a blended sound that is distinctive from the two letters that constitute it may actually be an advantage to braille readers (Harley, Truan, & Sanford, 1997). In our study, neither the advantage of fewer symbols nor the use of special symbols for blends were strong enough to influence general word-recognition skills.

The complexity of rules for recognizing words is also a factor in word recognition. Walhof (2001) stated, from her experience as a teacher of students with visual

impairments, that the complexity of rules was not an obstacle for children. However, this perspective considers only successful readers. It does not consider the visually impaired children in the United States who have been unable to learn braille and are among the 32% of nonreaders or the 6% of auditory learners (Federal Quota Census, 2001). The argument that many children can master braille with the early introduction of contractions is weak; it implies that contracted braille should be used from the beginning because some capable readers are successful with it. Not only does this assumption fail to acknowledge the unsuccessful learners, but it overlooks the possibility that successful readers may read even faster or more efficiently with a different method of learning to read.

The interviews with the students did not yield extensive information about the use of uncontracted braille, perhaps because each student had only one early learning experience. However, the students remembered abundant preliteracy experiences, including early exposure to braille and prebraille activities during preschool and kindergarten. Although it was their parents and/or teachers who decided to begin with uncontracted braille, the students had no difficulty learning this way. The students now believe that uncontracted braille helped them to acquire a strong foundation for the development of literacy.

Once they were accustomed to reading uncontracted braille, the students made the transition to contracted

braille over one to two years. A possible explanation for the variation in the length of the transition period is that each individual may have a different pace and style of learning, and teachers may adjust such diversity by controlling the number of new contractions and rules.

One student stated that uncontracted braille led to good spelling skills. The students were confident in learning uncontracted braille from the beginning because it provided them with the spelling skills that are significant for developing literacy. Conclusions could not be drawn about the effects of the method on families, since two children grew up in braille-reading households, one family was non-English speaking and did not attempt to learn braille, and two families did learn uncontracted braille. Further research is needed to determine what encourages families to be involved in the development of their children's braille-reading skills.

Generally, the teachers in this study noted that the existence of additional disabilities in their students was a reason for considering the early use of uncontracted braille. Students with multiple disabilities who may have the potential to be functional readers could benefit from using uncontracted braille from the beginning (Johnson, 1989) because uncontracted braille retains a one-to-one correspondence with print and thus helps visually impaired children focus only on the same aspects of the language as their sighted

classmates, not braille contractions and/or rules. Uncontracted braille allows students with learning disabilities to master the use of braille more easily by beginning with a less complex code (Troughton, 1992).

The teachers noted several problems related to the early use of contracted braille. First, contracted braille does not have the same rules as does ink print. In view of the limited services available from teachers of students with visual impairments, the students must be able to learn along with their sighted peers (Ryles, 1996). The use of uncontracted braille not only ensures that students keep pace with their classmates in public schools, but allows them to be independent readers earlier. Often, the students in this study indicated that they needed to ask their teachers when they were confronted with contractions that they did not know and that the classroom teachers could assist the braille readers when uncontracted braille was adopted. Second, the use of computer technology requires students to be more familiar with full spelling than ever before, and beginning with contracted braille can hinder students from developing good keyboarding skills (Duran, 1994). Third, the phonetic skills of students who begin exclusively with contracted braille may be impaired because the contractions are not consistent with the rules of ink print, such as syllables, characters, and/or sentences.

Two teachers indicated that the lack of availability of materials prevented them from even considering

uncontracted braille as the first reading medium, especially for capable students who need large quantities of materials. Even though the development of computer technology in braille production has reduced the time and effort required to transcribe print materials to braille, teachers cannot produce all materials, such as storybooks and supplemental reading materials, for their students. It may be time for production agencies to increase the number of books available in uncontracted braille.

Most of the participants indicated that they had frequent and prompt feedback from their classroom teachers but not from their classmates. The teachers may not have observed interactions between sighted and blind students related to the use of uncontracted braille, or perhaps no differences resulted from the use of uncontracted braille. The reader must consider the degree to which the finding of no difference suggests that uncontracted braille is a viable alternative for early braille instruction, given its other advantages.

Limitations

This study had several limitations. First, the BRI (Johns, 1997, 2001) was administered by individual teachers. Although precise instructions with the entire manual had been provided, the testing situation might have varied among the students. Second, demographic data and test results were self-reported, which may be a problem if different participants interpreted the same

item differently or if the teachers of students with visual impairments made decisions that were favorable to their own students. Finally, the study examined and reported data that were collected from short periods, with a single administration of the BRI (Johns, 1997, 2001) and a onetime interview. Therefore, the data may not reflect the true range of the participants' reading abilities and skills.

Conclusion

The results of this study indicate that the participants who learned to read uncontracted braille did not demonstrate different reading abilities from those who were taught contractions from the beginning, as measured by the BRI (Johns, 1997, 2001) and the Spelling/Braille Error Analysis (Koenig, 1987). In addition, the teachers and students who were interviewed described advantages of using uncontracted braille for early reading, and the teachers viewed it as a viable choice for some students. The study provided some control by ability level, since the participants were matched according to reading level, a feature that was not addressed in previous studies.

Unquestionably, the use or nonuse of contractions is only one of an array of characteristics that may affect long-term efficiency of braille reading. Given the importance of other factors, such as environmental and intellectual variables, mechanical skills, and instructional variations, it is virtually impossible to

control the reading context when assessing the effects of contractions. If the preponderance of research on the effects of the use of contractions indicates no differences based on that factor, it will be a sufficient reason to question the current practice of introducing contractions when a child is learning to read. If it is established that the early introduction of contractions provides no advantage in reading skills, then teachers will have support for making individual decisions on the basis of other factors, such as motivation, context, and instructional setting.

Future studies should encompass other variables that are related to the development of reading skills over time, so that the use of a full continuum of braille forms during early reading can be analyzed. In addition, research with a larger sample will help professionals to verify the effects of contracted forms on reading. Research on intervention with students who are learning to read using uncontracted braille can provide more specific answers to questions about the effects of uncontracted braille on the acquisition of reading skills and the nature of early reading experiences in the classroom and with families.

The teachers and students who were interviewed cited several advantages to teaching uncontracted braille to early readers: a greater consistency of rules for early readers with learning difficulties, social and academic advantages of learning a symbol system like the one that is taught to all students in regular classrooms, and

opportunities for parents to learn their child's reading medium more easily. These findings reinforce the questions raised by Troughton's (1992) study and emphasize the need for rigorous research about how contractions are best introduced in early reading instruction. The finding that the reading skills of children who learned to read using uncontracted braille did not differ from the skills of those who began with contractions suggests that researchers must continue to explore outcomes related to how and when contractions are introduced, even when that exploration means questioning accepted practices.

References

Ashcroft, S. C. (1960). *Errors in oral reading of braille at elementary grade levels.* Unpublished doctoral dissertation, University of Illinois: Urbana.

Chard, D., & Osborn, J. (1999). Word recognition instruction: Paving the road to successful reading. *Intervention in School and Clinic, 34,* 271–277.

Cunningham, A., & Stanovich, K. E. (1998). What reading does to the mind. *American Educator, 22,* 8–15.

Duran, P. (1994). *A call for reason and action.* Unpublished manuscript [on-line]. Available: www.isc.rit.edu/˜easi/easisem/brl.htm

Durre, I. K. (1996). How much space does Grade 2 braille really save? *Journal of Visual Impairment & Blindness, 90,* 247–251.

Federal Quota Census. (2001). Distribution of Eligible Students Based on the Federal Quota Census. [Online.] Retrieved March 25, 2002, from http://www.aph.org/fedquotpgm/ dist01.html.

Foulke, E. (1991). Braille. In M. A. Heller & W. Schiff (Eds.), *The psychology of touch* (pp. 219–238). Hillsdale, NJ: Lawrence Erlbaum.

Harley, R. K. (1969). *Comparison of several approaches for teaching braille reading to blind children: Final report.* Nashville, TN: George Peabody College for Teachers, Vanderbilt University.

Harley, R. K., Truan, M. B., & Sanford, L. D. (1997). *Communication skills for visually impaired learners: Braille, print, and listening skills for students who are visually impaired* (2nd ed.). Springfield, IL: Charles C Thomas.

Irwin, R. B. (1955). *As I saw it.* New York: American Foundation for the Blind.

Johns, J. L. (1997). *Basic reading inventory: Pre-primer through grade twelve and early literacy assessments* (7th ed.). Dubuque, IA: Kendall/Hunt.

Johns, J. L. (2001). *Basic reading inventory: Pre-*

primer through grade twelve and early literacy assessments (8th ed.). Dubuque, IA: Kendall/Hunt.

Johnson, L. (1989). Let's teach grade one braille. *Journal of Visual Impairment & Blindness, 83,* 491–493.

Kederis, C. J., Siems, J. R., & Hayes, R. L. (1965). A frequency count of the symbology of English braille Grade 2, American usage. *International Journal for the Education of the Blind, 15,* 38–46.

Koenig, A. J. (1987). *A study of expressive writing skills of blind students including partial replication of the National Assessment of Educational Progress third writing evaluation* . Unpublished doctoral dissertation, Vanderbilt University, Memphis, TN.

Koenig, A. J., & Ashcroft, S. C. (1993). An analysis of errors in braille writing samples. *Journal of Visual Impairment & Blindness, 87,* 12–18.

Koenig, A. J., & Holbrook, M. C. (1995). *Learning media assessment of students with visual impairments: A resource guide.* Austin: Texas School for the Blind and Visually Impaired.

Lorimer, J., & Tobin, M. J. (1979). Experiments with modified Grade 2 braille codes to determine their effect on reading speed. *Journal of Visual Impairment & Blindness, 73,* 324–328.

Lowenfeld, B., Abel, G. L., & Hatlen, P. H. (1969). *Blind children learn to read* . Springfield, IL: Charles C Thomas.

Nilsson, B. (1982). Braille: A medium for everybody? *Journal of Visual Impairment & Blindness, 76,* 197–199.

Nolan, C. Y., & Kederis, C. J. (1969). *Perceptual factors in braille word recognition.* New York: American Foundation for the Blind.

Pester, E. J. (1998). *Preliminary draft report on survey of Grade 1 and Grade 2 braille reading materials for children* . Unpublished manuscript. Louisville, KY: American Printing House for the Blind.

Pikulski, J. J. (1990). Informal reading inventories. *The Reading Teacher*, *43*, 514–516.

Ryles, R. (1996). The impact of braille reading skills on employment, income, education, and reading habits. *Journal of Visual Impairment & Blindness, 90,* 219–226.

Stanovich, K. E. (1986). Matthew effects in reading: Some consequences of individual differences in the acquisition of literacy. *Reading Research Quarterly*, *21*, 360–407.

Troughton, M. (1992). *"One is fun": Guidelines for better braille literacy.* Brantford, Ontario: Dialatype.

Walhof, R. (2001). Braille contractions: Are they really so hard? *Braille Monitor, 44,* 258–261.

Wormsley D. P., & D'Andrea, F. M. (1997). *Instructional strategies for braille literacy.* New York: American Foundation for the Blind.

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