Written Language of Deaf and Hard-of-Hearing Students in Public Schools

Shirin D. Antia  
Susanne Reed  
University of Arizona  
Kathryn H. Kreimeyer  
Arizona State Schools for Deaf and Blind

We obtained data on the writing of 110 deaf or hard-of-hearing students attending public schools who completed the spontaneous writing portion of the Test of Written Language. The average written quotient for the sample was in the below-average range but within 1 standard deviation of the test mean. Forty-nine percent of the sample received written quotients within or above the average range. Mean scores for the three subtests of contextual conventions, contextual language, and story construction were within the low-average range; between 55% and 68% of students scored within the average or above-average range for the subtests. Predictors of writing quotients were eligibility for free lunch, grade, degree of hearing loss and gender; however, only 18% of the variance in total writing quotients was explained by these variables. The data indicate that attention needs to be paid to the writing ability and instruction of many public-school students regardless of degree of hearing loss.

Currently, approximately 75% of all deaf and hard-of-hearing (D/HH) students receive their education in local public schools (Karchmer & Mitchell, 2003). Data from the Annual Survey of Deaf and Hard-of-Hearing Children and Youth for 2000–2001 show that, of these students, 42% are educated primarily in general-education classrooms, 17% receive instruction that is split between special-education resource rooms and the general-education classroom, and 38% receive instruction primarily from a teacher of D/HH students in a self-contained classroom. Although large numbers of D/HH students are educated in general-education classrooms (Holden-Pitt & Diaz, 1998) educators continue to express concern that the quality of their learning in general-education classrooms might be less than optimal for communication access and interaction (Ramsey, 1997; Shaw & Jamieson, 1997; Stinson & Antia, 1999). Given the numbers of students and the concerns in the field regarding appropriate educational placement, it is important to examine the academic achievement of these students particularly in the areas of English literacy.

The data on academic achievement of public-school students who are D/HH indicates that they have higher scores than students educated in special schools (Allen, 1986). Within public schools, students who spend more time in general-education classrooms have higher achievement than students who receive less instruction in general-education classrooms (Reich, Hambleton, & Houldin, 1977). However, it is not clear whether their achievement is a consequence of their educational placement or the initial reason for such placement. Kluwin (1993) suggests that while, initially, more capable students are placed in general-education classrooms, exposure to challenging curriculum and peer pressure can additionally have further positive effects on their achievement.

Karchmer and Mitchell (2003) reported the Stanford reading comprehension scores of 8-year-old and 15-year-old D/HH students in special and public schools. Public-school students were further divided between those who received minimal instruction in

Correspondence should be sent to Shirin Antia, University of Arizona, College of Education, Department of Special Education and Rehabilitation, P.O. Box 210069, Tucson, AZ 85721–0069 (e-mail: santia@u.arizona.edu).
general-education classrooms and those who received
substantial instruction in general-education class-
rooms (actual h of instruction were not provided). Although
the median score was highest for students who received
substantial instruction in general-education class-
rooms, Karchmer and Mitchell noted that the spread
of scores was wide at both ages and in all settings.
Thus, while there appear to be academic benefits for
some students attending general-educational classes,
the extent of these benefits is not clear. Kluwin (1993)
reported the results of a 5-year longitudinal study of
academic achievement of 325 adolescents from 15
public schools. He consolidated reading, writing, and
math measures for an overall academic achievement
score. Achievement was significantly different across
degrees of general-education instruction: Students
who regularly attended general-education classes had
the greatest change in scores followed by students in
self-contained classrooms. Students who attended only
one general-education class had the lowest change in
scores and the lowest adjusted achievement scores.
However, regression analyses showed that most of
the variance in achievement was due to demographic
variables (hearing loss, ethnicity, and gender) with
only 2% attributable to educational variables such as
placement or curricular track.

Although a majority of D/HH students attend
public schools, their profile of demographic character-
istics is different from students who attend special
schools. They tend to have less severe hearing loss, are
more likely to use oral language as their primary mode of
communication, and are less likely to belong to ethnic
minority groups or to have additional disabilities than
students in special schools (Kluwin & Stinson, 1993;
Schildroth & Hatto, 1996). Although their mean
achievement may be higher than students in special
schools, there is little data comparing their performance
to general-education students at their age or grade level
(Stinson & Antia, 1999), particularly in areas of English
literacy. Although students with mild and moderate
degrees of hearing loss are likely to have better English
literacy than deaf students because of increased access to
oral language, they may not necessarily achieve at the
same level as their hearing peers.

The focus of this article is the writing achievement
of D/HH students being educated in public schools.
For D/HH students in public schools, one would
expect (as a group) that their writing achievement
would be higher than students in special schools;
however, it is important to know how they compare to
norms for the general student population. Such data
have implications for the amount and quality of special
services offered to these students. If their writing
achievement is below the norms for the general stu-
dent population, should special services from a teacher
of D/HH be increased? Are teachers of D/HH
well qualified to offer instruction in writing? Or,
following Kluwin’s reasoning, does instruction in
general-education classrooms result in more challeng-
ing curriculum delivery either because of the subject-
matter skills of the teacher or the presence of good
peer models? Data on writing achievement may help
determine how much focus is necessary on this as-
pect of English literacy. It is also important to exam-
ine the variables accounting for differences in writing
achievement among public-school students.

Writing is one of the most complex and difficult
tasks for all students—D/HH and hearing—to master.
At a basic level, writers must produce letters, words,
and sentences that are readable by an audience. In other
words, they must know the conventions of spelling
and punctuation and use appropriate vocabulary and
syntactical structures. At a higher level, they must be
able to select topics, plan and organize ideas, and make
decisions about the information to provide their
audience (Powers & Wilgus, 1983). Several authors
(Moores, 1996; Paul, 1998) have commented on the
difficulty that D/HH students have writing in English.
Because of difficulty accessing and learning English
syntactical and morphological structures, either audi-
torily or visually, they make numerous errors at the
sentence level. In addition, because many D/HH
students have difficulty with reading, their exposure
to models of good writing may be limited. Finally,
teachers of D/HH often emphasize an approach to
writing that focuses on producing basic sentences, re-
sulting in writing that, while correct, may be uninter-
esting, uninformative, and not coherent. (Maxwell &
Falick, 1992; Yoshinaga-Itano, Snyder, & Mayberry,
1996b).

Research on the writing of school-age D/HH
students shows that they display considerable delays
when compared with hearing classmates. Several authors have conducted analyses on the written stories of school-age D/HH and hearing students in an attempt to determine their use of basic and advanced skills in comparison to hearing peers and to chart their development of these skills. When looking at the results of this research it is important to note that while several of these studies have been conducted on D/HH students in public schools, most researchers have limited the study population to students with severe and profound hearing loss (Musselman & Szanto, 1998; Yoshinaga-Itano & Snyder, 1985; Yoshinaga-Itano, Snyder, & Mayberry, 1996a; Yoshinaga-Itano et al., 1996b). However, many D/HH public-school students have mild and moderate hearing loss, and little is known about their performance in contrast to their hearing peers. While some researchers (Musselman & Szanto, 1998) have examined the writing of D/HH students receiving instruction in general-education classrooms, much of the research has been conducted with students receiving instruction in resource rooms or self-contained settings (Heefner & Shaw, 1996; Maxwell & Falick, 1992; Powers & Wilgus, 1983).

One focus of researchers has been the syntactical structure of sentences written by D/HH students and changes in these structures with age. Regardless of students’ educational placements, researchers have reported positive changes in measures of syntactical structure with increasing age (Heefner & Shaw, 1996; Powers & Wilgus, 1983). However, D/HH students make slower progress than hearing children (Yoshinaga-Itano & Snyder, 1985), and the frequency of production of several syntactical structures differs significantly from that of the hearing comparison group (Yoshinaga-Itano et al., 1996b). Not surprisingly, D/HH students continue to lag behind hearing peers in their syntactic constructions even in adolescence. In one of the few examinations of D/HH students on a standardized writing test, Musselman and Szanto (1998) administered the spontaneous writing subtest of the Test of Written Language–2 (TOWL–2; Hammill & Larsen, 1988) to a sample of 69 adolescents between 14.5 and 19.5 years of age enrolled in a variety of programs ranging from special schools to general-education classrooms. The average scores for the group on syntactic maturity (a measure of grammatical complexity and accuracy) fell more than 1 standard deviation below the mean for the test. Thus, while the grammatical complexity of D/HH students’ writing may increase over time, current research shows that D/HH students, even those in public schools, may experience difficulty with grammatical constructions throughout their school years.

In addition to the syntax of written language, authors have found that D/HH students exhibit difficulty with cohesion of ideas in writing. Yoshinaga-Itano and her colleagues (Yoshinaga-Itano et al., 1996a, 1996b) analyzed the written essays of D/HH children (in a variety of educational placements) and reported that they were able to communicate main ideas but did not elaborate or provide details in their writing. The text they produced had few redundancies and also few cohesive devices to tie text together. Maxwell and Falick (1992), examining written essays of D/HH students between grades four and eight in special schools, found that although both D/HH and hearing students increased their use of cohesion as grade level increased, the D/HH students’ lexical cohesions consisted mainly of word repetition. These authors also found that the deaf students’ compositions were less frequently conceptually linked than those of hearing students. However, expression of ideas may give D/HH adolescents less trouble than syntax. Musselman and Szanto (1998) found that D/HH adolescents’ average scores for the thematic maturity subtest on the TOWL–2 fell within the average range for the test.

Another question of interest to researchers is the variables that affect the written language of D/HH students. Variables that have been examined include mode of communication and degree of hearing loss. Musselman and Szanto (1998) divided their total sample of 69 students into two groups, 15 who used auditory/oral communication and 54 who used sign. They found that students using auditory/oral communication scored higher than students who used sign on each of the subtests of the TOWL. Moreover, the overall writing quotient of the auditory/oral students was only slightly below the test average, whereas the quotient of the signing students was almost 1 standard deviation below the test average. However, 14 of the 15 auditory oral students were educated in general-education
classrooms, while 37 of the 45 signing students were educated in segregated classrooms. Thus, mode of communication could potentially be confounded with placement, which in turn could affect intensity or quality of instruction.

Yoshinaga-Itano and Downey (1996) examined the written language of 461 D/HH students (in a range of educational settings) and 94 hearing students in Colorado between ages 7 and 18 years. They reported increased delays in written language (measured by words per t-unit) with increased degree of hearing loss. They also reported that the pattern of delay differed by degree of hearing loss. Students with mild and moderate hearing losses were delayed in written language compared to hearing peers up to age 13, but showed performance similar to hearing peers by high school. Students with moderate hearing loss and greater also made progress with age, but showed delays compared to hearing peers at all ages, with the delay growing progressively greater as hearing loss increased. By high school (ages 15–16), students with severe and profound hearing loss were reported to demonstrate skills similar to those of hearing students at ages 9 and 10 years.

To summarize, the written language of D/HH students differs from their hearing peers on several dimensions. The writing of D/HH students continues to improve with age. However, students with severe and profound hearing losses, regardless of educational placement, remain considerably delayed when compared with their hearing peers. The scanty information about students with moderate and mild losses indicates that they may be delayed initially but may catch up with their peers by adolescence. Students who use auditory/oral communication may be less severely delayed in writing than children who use sign. However, this finding is tentative because of the small number of students evaluated and the potentially confounding variable of educational placement. Overall there is little information on the writing achievement of D/HH students in public schools, specifically those who attend general-education classrooms and those who have mild or moderate hearing losses.

The purpose of the present study is to describe the writing achievement of a large sample of D/HH students in public schools, including students who spend most of their day in general-education classrooms and students who have mild hearing loss. The data were collected over a 3-year period as part of a study examining the academic status of D/HH students in public schools. The specific research questions are as follows:

How do writing scores of D/HH students in public schools compare to published norms on a standardized test of writing?
Are there patterns of relative strength and weakness evident in the writing scores obtained?
What variables, if any, account for differences in writing among students?

The data for this study were collected in a state where the School for the Deaf provides services to children in public schools through regional cooperatives that have contractual agreements with individual school districts. The state is divided into five regional cooperatives. Each cooperative has a director who hires and supervises teachers of D/HH students who provide services to the D/HH students in the region. The state is one that espouses inclusion and, consequently, students with disabilities typically attend general-education classrooms for most, if not all, of their school day. At the time the data were collected, the School for the Deaf served 495 D/HH students in their local public schools through the regional cooperatives. In contrast 305 D/HH students were educated in the two self-contained campuses (also part of the School for the Deaf).

Methods

Participant Selection

The data presented were collected as part of a project to develop an accountability program for D/HH students being served by the regional cooperative programs. All students attended public schools, and most were in general-education classrooms. All D/HH students who received direct services from a teacher of D/HH students were eligible for inclusion regardless of degree of hearing loss. We attempted to obtain geographic balance by selecting 20% of eligible students within each regional cooperative program and to
sample for representation by gender, grade level (elementary or secondary), and level of service delivery (consultation, itinerant services, resource room). There was also an attempt to sample students served by a range of teachers: Teachers were asked to provide information for a maximum of two students on their caseloads even if they had additional eligible students. Because each region of the state was represented, both urban and rural areas were included. Over a 3-year period 110 students between 3rd and 12th grade completed the writing test as part of a larger standard battery of assessment instruments.

Instruments

The instrument used to measure writing was the Test of Written Language, third edition (TOWL–3; Hammill & Larsen, 1996). This test has two sections: a contrived writing section consisting of a series of multiple-choice questions that assess vocabulary, spelling style, and sentence structure; and a spontaneous writing format, in which the student generates a story in response to a picture prompt. For this research, only the spontaneous writing section was administered to students.

The written story is prompted by one of two pictures. One picture depicts a pre-historic scene showing a group of mammoths and hunters; the second is a futuristic space scene. The student is shown one of the pictures, and given 15 min to write a story. As part of the instructions, students are told to write a story about the picture; they are reminded that a well-formed story has a beginning, middle, and end, and uses paragraphs and punctuation. The essays are evaluated to yield a spontaneous writing quotient and sub-scores in three areas: contextual conventions, contextual language, and story construction. The contextual convention score includes an evaluation of punctuation and spelling. The contextual language score includes an evaluation of sentence structure, grammatical conventions, and vocabulary; the story construction score includes an evaluation of the structure (beginning and end) sequence, plot, and interest level.

The TOWL–3 was normed on a sample of 2,217 hearing students between the ages of 7 and 17 years. Ten percent of the sample had disabilities but no specific mention is made of students who are D/HH being included in the norming sample. The TOWL–3 has been criticized for use with D/HH students because students who are not familiar with the kind of information depicted in the picture prompt may have difficulty developing a story (Yarger, 1996). However, we collected pilot data on a number of other writing instruments and found that the TOWL–3 was the best available choice for the following reasons: the picture prompts elicited longer and more sophisticated essays than tests in which students were asked to write a letter; it was normed on students from Grades 3–12 whereas other tests had a narrower range of grades; and reliable scoring was possible in three distinct areas of writing, allowing us to look at writing strengths and weaknesses.

Demographic information for each student was obtained from the teacher of the D/HH students; the teacher obtained these data from student files. Demographic data collected included degree of hearing loss, mode of communication, preferred language at school and home, use of interpreters, number of h in the general-education classroom, and eligibility for free lunch.

Data Collection

The TOWL–3 was administered individually to each student by the teacher of D/HH who normally served that student. The test was administered during their regular meeting time. Each teacher was sent the test booklet with instructions and the pictures. The written essays were returned to the researchers and scored by the second author and three graduate students.

Because D/HH students’ written essays can be difficult to score, we developed a protocol to ensure that each essay was scored accurately and reliably. First, the three authors scored 10–12 essays by D/HH students to determine whether these essays could be scored by the rules in the manual or whether additional scoring decisions needed to be considered. The second author was the criterion scorer and trained three graduate-student scorers. Each scorer read the scoring manual, met with the criterion scorer to receive training, and practiced scoring criterion essays until an inter-scorer reliability of 80% with the criterion
scorer was obtained for three consecutive ratings. Inter-scorer reliability was obtained by scoring agreement or disagreement for each scored item and using the following formula: \# of agreements / \# of agreements plus disagreements * 100. Once the reliability criterion was reached, graduate students independently scored the essays. To prevent scorer drift, every 10th essay was scored both by the graduate-student scorer and the criterion scorer. If agreement was below 80%, differences were discussed and settled between the scorers. This process continued until the graduate-student scorer and the criterion scorer independently reached the reliability criterion, at which point the graduate student returned to scoring essays independently.

Results

The results section presents (a) the demographic characteristics of the students participating in the study, (b) descriptive data on TOWL Quotients and subtests for the total sample, broken down by demographic characteristics, and (c) a regression analysis to determine the pattern of relationships between the demographic variables and TOWL scores.

Participant Characteristics

Demographic characteristics are presented for all students who took the test. Table 1 shows the demographic characteristics of students in the sample. Unfortunately, not all data are available for the entire sample; therefore, the number of students for whom specific data are unknown is also included. An examination of Table 1 indicates that the number of elementary and secondary students is approximately equal with a slightly larger number of elementary students. More females than males were in the sample. Degree of hearing loss is distributed over the range, with the largest single group of students having average unaided hearing losses over 85 dB. Students with unilateral hearing loss are represented because they were receiving services from a teacher of D/HH. Students with hearing losses classified in the 0–25 dB range were typically students who had previous conductive losses (but still received services) or students with a high-frequency loss. Over 50% of the students used English as their primary language. Students reported as using more than one language typically used English along with Spanish or Navajo (specific ethnicity information on students was not available). A majority of students in the sample preferred to use

<table>
<thead>
<tr>
<th>Table 1 Student characteristics</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
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<td>Total number of children</td>
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<td></td>
</tr>
<tr>
<td>Grade</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elementary (Grades 3–6)</td>
<td>62</td>
<td>56</td>
</tr>
<tr>
<td>Secondary (Grades 7–12)</td>
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<td>44</td>
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<tr>
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<td>(unaided)</td>
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<tr>
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<td>6</td>
</tr>
<tr>
<td>0–25 dB</td>
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<td>7</td>
</tr>
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</tr>
<tr>
<td>86–100+ dB</td>
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<td>24</td>
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<tr>
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<td>7</td>
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<tr>
<td>Student’s home language</td>
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<td>55</td>
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<td>Spanish</td>
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<td>6</td>
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<tr>
<td>Interpreter use</td>
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<td>61</td>
</tr>
<tr>
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<tr>
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<td>7</td>
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<tr>
<td>Hours/day in regular classroom</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0–2</td>
<td>17</td>
<td>16</td>
</tr>
<tr>
<td>3–5</td>
<td>28</td>
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</tr>
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<td>45</td>
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</table>
spoken language and did not use an interpreter in class. Time spent in the general-education classroom ranged from no h per day to more than five h per day, but most of the students spent 5 or more h of the school day in the general-education classroom. Free lunch was used as an indicator of socio-economic status.

Descriptive Data

The TOWL yields a spontaneous writing quotient, which is a standard score with a mean of 100 and a standard deviation of 15. Scores of 90–110 are considered average (Hammill & Larsen, 1996). The mean writing quotient for all participants was 88 with a standard deviation of 27. Thus, the score for the total sample fell in the below-average range of the test, but within 1 standard deviation of the mean. Figure 1 shows the percentage of students scoring at below-average, average, and above-average levels for the written quotients. Thirty-two percent of the participants scored in the average range, 17% in the above-average range, and 51% in the below-average range. Of the students in the below-average range, 5% (6 students) received a score of 0 because they produced unscorable essays.

We further examined the subtest scores (contextual conventions, contextual language and story construction) to detect any patterns of specific writing strengths or weaknesses. The subtest standard scores have a range of 1 to 20, with a mean of 10 and a standard deviation of 3; scores between the range of 8 and 12 are considered average. The total group of students scored at the low end of the average range (8.3–8.6) on each subtest (Table 2). Figure 1 shows the percentage of students receiving below-average, average, or above-average scores on each subtest. Sixty-four percent of students received average or above-average scores in contextual conventions, 55% of students received average or above-average scores in contextual language, and 68% of students scored average or above average in story construction.

We further examined the quotients and subtest scores to see if any patterns emerged by student characteristics. Table 2 presents the subtest mean scores and the TOWL written quotient by characteristics of students. Most subtest scores were within the low-average range (8–12). None were below 6, which is the range of scores considered “poor.” An examination of Table 2 shows that the following subgroups received writing quotients 1 standard deviation below the mean: elementary students, students who were male, students who had moderate to severe losses (46–85 dB), students who used sign alone, students who used interpreters, students who spent less than 3 h a day in the general-education classroom, and students who were eligible for free lunch.

To further analyze the relationship between student demographic variables and TOWL quotients, we ran a stepwise multiple regression analysis with TOWL quotients and the TOWL sub-scores as the dependent variable and grade, gender, average hearing
thresholds in the better ear, communication mode, interpreter use, h per day in the general-education classroom, and eligibility for free lunch as the independent variables.

Table 3 shows the results of the regression analyses. Only 18% of the total variance in the TOWL quotient was explained by the demographic variables. Demographic variables predicted only 6% of the variance for contextual conventions, but a much greater percentage for contextual language (31%) and story construction (27%). Eligibility for free lunch predicted 6% of the variance for the total TOWL quotient and 11% of the variance for story construction. Grade explained 5% of the variance in TOWL quotients, 9% of the variance for contextual language, and 5% of the variance for story construction. Gender was the only predictor variable for all scores and explained 4% of the variance in TOWL quotients, 6% of the variance in contextual conventions, 9% of the variance for contextual language, and 4% of the variance for story construction. Interpreter use predicted 13% of the variance in contextual language and 7% of the variance in story construction. Finally, hearing loss explained 4 % of the variance for the TOWL quotient.

<table>
<thead>
<tr>
<th>Table 2</th>
<th>TOWL Writing quotients and sub-score means by student characteristics</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Contextual Conventions Mean¹</td>
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<tr>
<td>Total</td>
<td>8.3</td>
</tr>
<tr>
<td>Grade</td>
<td></td>
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<tr>
<td>Grades 3–6</td>
<td>7.9</td>
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<td>Grades 7–12</td>
<td>8.9</td>
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<td>Gender</td>
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<td>Male</td>
<td>7.4</td>
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<td>Female</td>
<td>9.0</td>
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<tr>
<td>Level of Hearing loss</td>
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<tr>
<td>Unilateral</td>
<td>10.1</td>
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<tr>
<td>0–25 dB</td>
<td>9.1</td>
</tr>
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<td>26–45</td>
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<td>66–85</td>
<td>8.3</td>
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<td>8.5</td>
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<td>Communication mode</td>
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<td>Spoken and signed</td>
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<td>Sign alone</td>
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<td>Interpreter use</td>
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<tr>
<td>0–2</td>
<td>8.3</td>
</tr>
<tr>
<td>3–5</td>
<td>8.2</td>
</tr>
<tr>
<td>5+</td>
<td>8.4</td>
</tr>
<tr>
<td>Free Lunch</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>7.9</td>
</tr>
<tr>
<td>No</td>
<td>8.8</td>
</tr>
</tbody>
</table>

¹Mean of subtests is 10 and SD is 3.
²Mean of TOWL Quotient is 100 and SD is 15.
*1 SD below test mean.
Discussion

The discussion is organized around the original research questions and implications for research and practice.

Comparison of Writing Scores to Published Norms

Overall, students in this sample of public-school students achieved writing quotients in the below-average range but within one standard deviation of the test mean. The spread of scores for the writing quotient for the sample was wider than that reported in the test manual (sample $SD = 27$ vs. test $SD = 15$). Approximately half the sample scored in the average to above-average range, while the other half scored in the below average range. Thus, although the scores indicate that, as a group, the D/HH students’ writing needs improvement, most students were able to produce a scorable essay; only 5% of the sample produced unscoreable essays. Although educators (Cohen, 1994; Polowe-Aldersley, 1994) have expressed concern about the quality of education that D/HH students receive in public schools, it is encouraging to note that 32% of students are able to achieve average levels of writing and that an additional 17% achieved in the above-average range.

Patterns of Strengths and Weaknesses in Writing

The mean sub-scores for the sample are all within the low-average range. However, examining the percentage of students scoring at above-average, average, and below-average levels reveals patterns of relative strengths and weaknesses in the various areas of writing. Relative strengths are in the areas of contextual conventions (punctuation and spelling) and story construction. Not surprisingly, the most difficult area is contextual language, which includes measures of vocabulary and syntax. Interestingly, the highest percentage of below-average scores and above-average scores were in the area of contextual language, emphasizing the wide variation in this area among D/HH students. Our results are similar to those reported by Musselman and Szanto (1998). These authors reported that the highest TOWL–2 sub-scores were in the area of style (similar to contextual conventions on the TOWL–3) and maturity (similar to story construction on the TOWL–3); the lowest sub-scores were in the areas of vocabulary and syntax (similar to contextual language on the TOWL–3).

Variables Affecting Writing

Each of the following variables had some relationship to the writing performance of this sample of students: gender, socioeconomic status (as measured by eligibility for free lunch), grade, degree of hearing loss, and interpreter use. Several of these variables have been shown by other researchers to predict academic achievement. Gender differences showing higher scores for females replicates a similar finding by Musselman & Szanto (1998), while socioeconomic status has been shown to be a predictor of academic achievement among D/HH students in public schools (Kluwin & Stinson, 1993).
We found grade a significant predictor of the writing quotient, contextual language, and story construction. An examination of writing scores by student characteristics (Table 2) indicates that while students in grades 3–6 received writing quotients 1 standard deviation below the mean, students in grades 7–12 received quotients close to the test mean. Positive changes occurred with increasing grade in all three areas of writing, with the greatest increase in the area of contextual language. Increases in writing achievement, specifically syntax, have been documented by other researchers examining the writing of students in self-contained settings (Heefner & Shaw, 1996; Powers & Wilgus, 1983). This finding indicates that, as a group, students in public schools are not falling further behind their peers as they move into higher grades.

We expected that degree of hearing loss would be a predictor of writing, as students with more hearing are more likely to have access to oral English, positively affecting their ability to learn English vocabulary and syntax. Degree of hearing loss was a significant predictor of overall writing quotients, but was not a significant predictor of any of the sub-scores. Because degree of loss explained only 4% of the total variance in writing, we question how clinically significant it is as a predictor variable for this group of students. In general, the data in Table 2 show that as students’ hearing losses increase, their writing scores decrease. However, students with moderate and moderately-severe hearing losses (46–85 dB) have scores lower than the students with severe-to-profound hearing loss. One explanation for this phenomenon is that students with greater hearing loss may be placed in general-education classrooms, while students with more moderate losses may be placed in general-education classrooms on a more routine basis. It is also possible that students with moderate hearing loss may actually have less communication access in the general-education classroom than students with severe to profound hearing loss whose access is facilitated by an interpreter.

Interpreter use was a significant predictor of both contextual language and story construction. The obvious explanation for the appearance of interpreter use as a predictor is that students using interpreters are more likely to use sign and have a greater degree of hearing loss, thus reducing their access to English. However, although mode of communication and degree of hearing loss are related to interpreter use, not all students who had severe to profound losses used sign language, nor did all students who used sign language use an interpreter in the classroom. Also, degree of hearing loss explained only a small proportion of variance. One explanation for the finding regarding interpreter use may be the quality of interpreted instruction. Students may have had less-than-qualified interpreters, thereby reducing their access to instructional content (Schick, Williams, & Bolster, 1999). Even if qualified interpreters are present, students may not be able to participate adequately in classroom discussion and peer interaction, which might in turn impact their ability to discuss their writing with peers, an activity that occurs in many writing classes.

The variables that did not significantly predict writing quotients or subtest scores were communication mode and hearing loss in the general-education classroom. Initially we had hypothesized that the latter variable would be an important predictor, either because students with high academic achievement spend more time in the general-education classroom or because of curricular exposure. However, other variables appear to be more important predictors of writing achievement. Simply spending time in the general-education classroom may not result in high-quality writing instruction for D/HH students. This finding is similar to that of Karchmer and Mitchell (2003), who reported no clear academic benefits related to time in general-education classrooms.

Finally, it must be noted that only 18% of the writing quotient was explained by demographic variables. Although other researchers suggest that demographic variables explain most of the variance in achievement (Kluwin, 1993; Kluwin & Stinson, 1993) we have to conclude that there are other variables, most likely instructional variables, that impact writing achievement.

Implications for Research and Practice

Because this is a descriptive study, the results must be interpreted with caution and several limitations must be noted. The measure of writing was limited to a single essay written in response to a standardized prompt.
It is possible that the instrument itself underestimated students’ writing ability since the essay was written within a short time (15 min) and the students were not required to revise their writing. The picture prompts may not have been of interest to, or within the general world knowledge of, some students and may therefore have affected the quality of their writing. Also, as noted by Musselman and Szanto (1998), the writing task itself may not be sufficiently motivating for all students. However, we must point out that all students, D/HH or hearing, taking this standardized test are subject to the same disadvantages. Another limitation is that while this sample of students represents D/HH students in public schools in the state in which the research was conducted, the sample may not be representative of public-school students nationally.

While it is interesting and important to examine the relationship between academic achievement and student demographic variables, further research needs to be conducted on the quality of writing instruction received by D/HH students in general-education classrooms, the access these students have to writing instruction, and the intersection of writing instruction with characteristics of students. It is also important to study the instructional support these students get in writing from teachers of D/HH. Many of these students are served by itinerant teachers of D/HH who may or may not spend time in writing instruction. Little is known about itinerant instruction, particularly how itinerant teachers determine the aspects of literacy instruction that they provide students. In a study of D/HH students in general-education classrooms, itinerant teachers reported that they provided direct writing instruction to approximately 50% of students (Antia, Reed, Kreimeyer, & Johnson, 2004). However, we have no data available on the kind of writing instruction provided. Generally, itinerant teachers see themselves as playing a support role in literacy instruction with the primary role being taken by the general educator (Reed, 2003). We need to examine the impact of the intensity and quality of writing instruction in the general-education classroom, the kind of support provided by the itinerant teacher for writing instruction, and the impact of both on writing of D/HH students. Furthermore, the access and impact of interpreted writing instruction needs to be examined.

The good news from this study is that older students performed better than younger students in syntax, story construction, and overall writing. The plateau reported by Musselman and Szanto (1996) was not evident except in the area of contextual conventions. However, this study cannot provide answers regarding which students make gains and which do not; longitudinal research on the writing of public school students would be informative. Another positive finding from this study is that though many of the D/HH students continued to struggle with the syntactic aspects of writing, a majority of them (68%) scored in the average or above-average range in story construction. It appears that somewhere in their educational programs they have received instruction in higher-level writing skills such as planning and organizing ideas.

In terms of practice, it is clear that even students who have access to oral English through audition have difficulties in various aspects of writing and probably need instructional support from both the general educator and the teacher of D/HH. The small amount of variance predicted by degree of hearing loss, and the finding that students with moderate hearing loss received scores 1 standard deviation below the mean, indicate that writing instruction should be a focus for most students with hearing loss. In this sample, the only students who scored at or near the test mean were students with unilateral and mild hearing loss. Hard-of-hearing students are a much-neglected population in the field of education of D/HH. This study supports the scanty research in the field that indicates that even moderate hearing loss can negatively affect educational outcomes (Blair, Peterson, & Viehweg, 1985; Yoshinaga-Itano & Downey, 1996).

Although educators have expressed reservations about using the TOWL with D/HH students because of the story prompts (Yarger, 1996), in this study 94% of students were able to produce a scorable essay in response to the pictures. Although the TOWL requires that the student produce only one genre of writing, we suggest that it can be used with this population, and can provide usable information. However, it is important to acknowledge that writing a narrative is much different than writing a persuasive essay or engaging in writing in content areas. Both instructional and
research attention need to be paid to these areas of writing for D/HH students in public schools.

To summarize, the mean writing score of this sample of D/HH students in public schools fell in the below-average range; half the students received below average scores. The most difficult aspect of writing for these students was vocabulary and syntax; the area in which most students did well was story construction. Only a small amount of variance in overall writing was explained by demographic variables, although demographic variables explained a substantial amount of variance in the sub-scores of contextual language and story construction.

References


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