Abstract

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adults: Access to linguistic skill
in adult and hearing

Determinants of spelling ability in adult and hearing
be briefly examined. In general, it may be said that hearing spellers appreciate
perception of spelling errors, but for reading and deaf persons this
interpretation of spelling errors holds for hearing and deaf persons will first
To put this issue in perspective, the research literature that pertains to
hearing college students is compared to that of
preparatory and phonologically deaf college students is compared to that of
spoken language. To examine this question, the patient of spelling errors for
spelling of English is derived from the observation of the orthography is derived from the
The question raised in the research presented here is to what extent the
in the act of spelling.
the information in the act of reading, and can fully and correctly package it
information in the act of reading. According to the hypotheses, the linguistic reader—who can
words in the lexicon, the linguistic reader—associates the morphological and
linguistic information that are contained in the orthographic representation
is a multi-layered system containing elements that are independent of the
orthography of English is a multi-layered system containing elements that are independent of the
it has been assumed that there exists a linguistic reader is in a sense that
it is possible that there exists a linguistic reader in the sense that

How the considerations that the orthography captures actually affect the

Many and opaque:

- The spelling of many words must appear alike.
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spell words. Some investigators have suggested that cells may contain visual memory and may send signals to the visual cortex. Some investigators have suggested that cells may contain visual memory and may send signals to the visual cortex.


Executive function. Executive function. The phonological and executive functions that English speakers have appear to come from a different source. These phonological mechanisms appear to come from a different source. These phonological mechanisms appear to come from a different source. These phonological mechanisms appear to come from a different source. These phonological mechanisms appear to come from a different source. These phonological mechanisms appear to come from a different source. These phonological mechanisms appear to come from a different source. These phonological mechanisms appear to come from a different source. These phonological mechanisms appear to come from a different source. These phonological mechanisms appear to come from a different source. These phonological mechanisms appear to come from a different source. These phonological mechanisms appear to come from a different source. These phonological mechanisms appear to come from a different source. These phonological mechanisms appear to come from a different source. These phonological mechanisms appear to come from a different source.
For the present study, subjects were chosen who have been profoundly

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Eighty of thelicher, level II words, the phoneme string was not completely recoded in the phonemic string, but could be obtained by reliance on spelling principles.

For level II words, the correct spelling was not completely recoded in the phonemic string.
In the other seven of the level 11 words, the underlying morpho-phonetic representation of the word and could be disambiguated by reference to a related word. The following stimuli fit this pattern: condemn, grammatical, digested, grammar, dictionary, permutable, repetition. For the level II words, mean frequency occurrence in written English was 8.60 (Kučera and Francis, 1967). The remaining stimuli were 45 words containing spelling patterns infrequent in English. These included some borrowed words that contained spelling patterns infrequent in English. The frequency of occurrence was 8.67 (Kučera and Francis, 1967).

In the production task, subjects were asked to spell the 45 words using a close procedure in which written sentence context was provided. This procedure was advantageous for both hearing groups. The following written instructions were given to subjects: "If you are not sure what word fits in the sentence context, ask the experimenter. PLEASE PRINT!"

Since this experiment was concerned only with spelling processes, the spelling of the word that fit in the blank was the correct response, as long as the spelling was provided with additional cues. If subjects had questions about a word to be spelled, the experimenter provided an alternative definition of the word. Words were not spoken for deaf subjects. Words were also used in the recognition task. On each trial there were...

Examples of sentences:

1. Temperature is measured in degrees F.
2. Beginner, desirable, galleries, heroes, ninety, noticeable, picknickers, thankful.
3. Imaginary, tanner, permutable, repetition, condemn, grammatical, digested, grammar.
occasion. Because data based on too few responses in each portion of the Nealy all subjects failed to respond with the correct word at least one spelling production task.

Results

based on only those trials that had been analyzed in the production task. Analysis of the production task was based on only those trials that were visually presented at the appropriate syllable, auditory in the recognition task were examined whether subjects would benefit in spelling accuracy from having not scored as omission. Since the purpose of the recognition task was to

in the recognition task was not scored as omission (c) the response was correctly spelled in the response was not scored at (a) A morphologically incorrect form of the target word in the current test of spelling proficiency. (b) A morphologically incorrect form of the target word in the current test of spelling proficiency. (d) A morphologically incorrect form of the target word in the current test of spelling proficiency. (e) A response item in a sentence at least half of the letters of the target word (a) A response item in a sentence at least half of the letters of the target word (b) A response item in a sentence at least half of the letters of the target word (c) A response item in a sentence at least half of the letters of the target word (d) A response item in a sentence at least half of the letters of the target word (e) A response item in a sentence at least half of the letters of the target word

Scoring

might choose (e) read for rood). On the other hand, some subjects make alternative choices when spelling (e.g., The alternative choices were generally phonologically consistent with the target word. The written instructions were as follows: Circle the correct spelling for each of the following words. If the correct spelling
test are unstable, it was decided to exclude from further analysis the data of those subjects who had as many as 15 responses scored as omissions (i.e., one-third of the total number of items). This criterion excluded 11 deaf subjects and no hearing subjects. Those excluded tended to be the poorest readers, but not necessarily the poorest spellers. Indeed, it is the case that the excluded deaf subjects scored significantly worse on the reading comprehension test than did the included deaf subjects. (25) = 4.41, p < 0.01, two-tailed.

One hearing subject was excluded for failure to complete the recognition task. The analysis of spelling proficiency in relation to orthographic transparency was based on the remaining 36 hearing college students and 16 deaf college students.

Results of the spelling production task for these subjects are shown in Figure 1. An analysis of variance was performed on the percentage correct responses for the three levels of orthographic transparency. Of major concern to the present study was the finding that there was a significant main effect of level of orthographic transparency, F(2, 100) = 107.82, p < 0.01. Mean analyses demonstrated significant differences between each level of orthographic transparency, (25) = 126.36, that did not interact with subject population, F(1, 100) = 1.71, p > 0.1. Post hoc analyses did not demonstrate significant differences between the three levels of orthographic transparency or between the two subject populations. These results indicate that words of different orthographic transparency were more often spelled correctly than words of low transparency (Fischer, 1980). Words of high orthographic transparency were consistently spelled correctly. Words of medium orthographic transparency were more accurately spelled by the deaf students than by the hearing students. Words of low orthographic transparency were more accurately spelled by the hearing students. Words of high orthographic transparency were more accurately spelled by the deaf students than by the hearing students. Words of low orthographic transparency were more accurately spelled by the hearing students. Words of medium orthographic transparency were more accurately spelled by the deaf students than by the hearing students.

Comparison of production and recognition tasks

Results comparing performance on the production task and the recognition task are shown in Figure 2. An analysis of variance was performed on the percent correct scores with the between-subjects factor of subject population and the within-subjects factors of orthographic transparency and task production task versus recognition task. A significant main effect of task, F(1, 50) = 62.63, p < 0.01, was observed. A significant main effect of orthographic transparency, MSe = 90.82, indicated that spelling performance was more accurate on the recognition task than on the production task. In addition, subject population interacted a greater improvement in performance on the recognition task for deaf subjects than for the hearing subjects.
Although a post hoc analysis revealed that there was a significant improvement in the recognition task for each group individually (for hearing subjects, F(1, 50) = 32.62, p < 0.001; for deaf subjects, F(1, 50) = 100; 0 > d' > 0.001), there were no other significant effects. The level of orthographic transparency was not itself a significant factor in the post hoc analysis. The mean percentage correct responses in the spelling production task as a function of the level of orthographic transparency are shown in Figure 1.

Figure 1. Mean percentage correct responses in the spelling production task as a function of the level of orthographic transparency.
Subject populations matched in overall spelling ability on the production task. This analysis was repeated on subjects of the two and meaning subtests. This analysis was repeated on subjects of the two subtests on the same underlying cognitive ability for deep in spelling, whether it builds on the same underlying cognitive ability for deep memory in spelling. This allows us to ask, given a particular level of competence in spelling, whether performance is better for overall or for specific subtests. With groups of deep and meaning subtests matched for overall performance, an examination of misspellings can be used to gain insight into the spelling error types.

Although both meaning and deep spellers benefited from the recognition task, the recognition task had a larger effect on the production task. The advantage of having recognition task reveals that spelling performance was more accurate on recognition tasks. To summarize, the comparison of performance on the production and recognition as shown in Figure 2, is that there is more improvement with the recognition task as a function of level of orthographic transparency.

Figure 2. Mean percentage correct responses in the spelling production and recognition tasks as a function of level of orthographic transparency.
errors were omission and insertion. This difference in the percentage of
omission and insertion, while for the deaf subjects 99 percent of the
omissions were for the hearing subjects. Only 10 percent of the
elements were for the deaf subjects made more errors than were
omissions for the hearing subjects. Despite this, the difference was
not statistically significant. The results support the hypothesis
that deaf subjects have a significantly lower rate of spelling.

The spelling test was performed with a list of words that were
selected from a large vocabulary. The words were divided into
two groups: one group consisted of words that were not
familiar to the subjects, and the other group consisted of words
that were familiar to the subjects. The results showed that the
deaf subjects made more errors for the unfamiliar words than
for the familiar words. However, the difference was not
statistically significant. The results also showed that the
deaf subjects made more errors for the words that were
pronounced with a single pronunciation, while the hearing
subjects made more errors for the words that were
pronounced with a multi-phoneme pronunciation. This
difference was statistically significant.

The results of the spelling test were also analyzed in terms of
the number of errors made for each word. The results showed
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difference was statistically significant.
Table 2.

Mean proportions of each error type for the matched subject groups. Showed in parentheses are the results of significance tests comparing each group. The table shows the mean accuracy of the spelling production task and the mean standard score on the Group Reading Comprehension Test.

Table 1.

Characteristics of the subject groups matched for spelling proficiency.

<table>
<thead>
<tr>
<th></th>
<th>N = 9</th>
<th>N = 9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading</td>
<td>6.0</td>
<td>6.0</td>
</tr>
<tr>
<td>Spelling</td>
<td>2.7</td>
<td>2.7</td>
</tr>
<tr>
<td>Total</td>
<td>96%</td>
<td>96%</td>
</tr>
</tbody>
</table>

Thus, these hearing and deaf subjects did not differ statistically on vowels. These differences are attributed to the significant difference in the proportion of vowel substitutions made by the two groups. The mean proportion of vowel substitutions made by the deaf subjects was significantly higher than that of the hearing subjects (t(16) = 7.90, p < 0.01).

Between the two groups, the effect size was calculated as d = 0.00. A t-test for independent samples was conducted to determine if the difference in vowel substitution proportions was statistically significant. The obtained t-value was 1.90, which is not significant at the 0.05 level. Therefore, the two groups did not significantly differ in terms of vowel substitution proportions.
differ significantly in their tendency to make vowel substitutions, \( r(10) = -0.11, p > 0.05 \), two-tailed. The greater difficulty in spelling vowel segments here and elsewhere with hearing subjects (Fischer, 1980; Masters, 1927; Seymour and Porpodas, 1980) underscores the greater complexity of vowel representation than consonant representation in English orthography.

Consistent with previous findings (Hanssen, 1982), several of the misspellings of the word, resulting in misrepresentations of the target word, that did not preserve the phonetic representation of the word were misspelled by deaf subjects. As 3.1 percent contained such an ordering error. Of the words misspelled by deaf subjects, 13.3 percent contained such an ordering error. Of the words misspelled by hearing subjects, only 0.9 percent contained this type of error.

The misspellings were further scored to examine whether or not they were orthographically regular. Only those responses that were pronounceable and had legal letter sequences were considered to be orthographically admissible. Two judges, independently scored the responses. Of the 280 misspellings considered in this analysis, the judges agreed on the classification for 94.2 percent of them. The results of this error analysis thus suggest that deaf spellers are sensitive to structural constraints shown by the production of misspellings that are phonetically possible letter sequences in the language. This finding indicates a relatively consistent ordering of the segments of a word. The findings suggest either that deaf
Table 3. Mean accuracy on the spelling production task and mean standard scores on the spelling comprehension test.

<table>
<thead>
<tr>
<th>Grades</th>
<th>Reading</th>
<th>Spelling</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-7</td>
<td>4.2</td>
<td>7.2</td>
</tr>
<tr>
<td>6-8</td>
<td>5.8</td>
<td>6.9</td>
</tr>
<tr>
<td>5-9-2</td>
<td>6.8</td>
<td>7.2</td>
</tr>
<tr>
<td>7-6</td>
<td>7.6</td>
<td>7.7</td>
</tr>
</tbody>
</table>

N = 37

For the purposes of examining the relationships between spelling and reading proficiency in relation to other language factors.

Spelling difficulties in deaf and hearing pupils.
adults, Fischer (1980) has shown that a word's difficulty from the standpoint of deaf and hearing subjects were compared. In earlier research with hearing subjects, the error rate of the orthographic is dependent on the spoken language, the error rates of the orthography is dependent on the spoken language, the error rates of the orthography is dependent on the spoken language, the error rates of the orthography is dependent on the spoken language.

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Discussion

In the achievement, $r = -0.002$, of spelling production, $r = -0.398$, $r = -0.44$.

The mean score in intelligence was $3.98$ and $2.5$. These mean scores indicate that deaf subjects performed a little better than the hearing subjects. For the $22$ deaf subjects whose data were used in this analysis, the average score of their group was $3.98$.

The results of this study show that the deaf subjects performed better than the hearing subjects in the spelling test. The deaf subjects showed a higher correlation with the orthographic representation of the words. The deaf subjects were able to spell the words more accurately than the hearing subjects.

A question of interest is how the spelling production differed from the deaf subjects. Although the results correlated
spellings that they are not able to retrieve in productive spelling. But even when he knowledge of spellers, seem to have knowledge about a word's shape, spelling does not guarantee their being able to use it in productive spelling. The correspondence between spelling and knowledge of a word is far from a perfect one. Higher order knowledge of spellers is likely to be more extensive than spelling knowledge. Researchers have found that the visual component plays a significant role in spelling. When the visual component is removed, the spelling becomes more difficult. Visual information is otherwise difficult to retrieve.

Visual information is otherwise difficult to retrieve. Visual information is otherwise difficult to retrieve. Visual information is otherwise difficult to retrieve. Visual information is otherwise difficult to retrieve. Visual information is otherwise difficult to retrieve. Visual information is otherwise difficult to retrieve. Visual information is otherwise difficult to retrieve. Visual information is otherwise difficult to retrieve. Visual information is otherwise difficult to retrieve. Visual information is otherwise difficult to retrieve. Visual information is otherwise difficult to retrieve. Visual information is otherwise difficult to retrieve.
found only a tenuous relationship in either population. The low correlations on
the repetition between reading comprehension and spelling proficiency.

Achievement, just as reading proficiency, though measure experience in reading, may

From the data of the present sample, residual spelling can be

(1979) who did not provide a control group. It is likely that residual

in the use of the phonetic speller. In the present study, however, the

for each speaker, of which the most likely candidates are speech-recipe.

The assumption here that good spellers may have difficulty in the speech-

pronounce representation of specific words.

Further, the nature of the English language permits the speaker to

The present study found that good spellers produced more

which affect spelling of words (Biemiller & Andrus, 1980). This is because

and III words. In addition, the results of the present study permit the

on level I, II, and III words. In addition, the results of the present study

and III words. In addition, the results of the present study permit the

pronounce and spell words correctly. However, the present study has not

pronounce and spell words correctly. However, the present study has not

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pronounce and spell words correctly. However, the present study has not
In summary, dead spellers in the present research were found to display an
and also to monitor less frequent errors.

of a particular word's spelling regardless of a stored representation of the word, do a check
be used instead. This feedback could serve both as a check
feedback may not always be visual. If feedback is
be the blocking of their view of their hands. Suggestions, however, that the
able to be visualized, then could be used instead like the auditory spells of the
recognition task. The fact that subjects sometimes mispronounce under the
visual feedback. The role of visual feedback in spelling words cannot be understated when certain
be a way of tying our spelling to our hand gestures in this fashion.
dead spellers were observed in finger-tapping exercises during the experiment.
feedback may also serve dead spellers as a productive system. The

reading, dead persons might also induce those rules from
readings, that persons might also induce those rules from
a manual alphabet. Which is readers might induce productive rules from
beginning, or otherwise. In spelling activity, the production of letters of
现货 in which words are spelled by the spelling-produced letters of
innovate the orthography. In finger-tapping, spelling might also provide a means of embedding appreciation of the
orthography might also provide a means of embedding appreciation of the

For dead persons with experience in manual communication, influence on
interest in this comparison is warranted, when compared with reading persons. It is of
comparable results from the comparison of the two tasks in this fashion. The
comparable results from the comparison of the two tasks in this fashion. The
correlation obtained between the two tasks, but as shown in Table 1, the
in fact in this comparison, when good, is a correlation between read.

For the dead spellers, in particular, there was a dissociation between read.

on the other hand, might make explicit use of these features.

found by because contrast at various levels is provided in the text. The speller,
ment with at rather local knowledge of the ortho-
possibility that spelling comprehension and spelling activity, in
References

It is possible given inherent limitations with the spoken language.


Hanon P.R., & Hanon F.R. (1975). The phonological basis of spoken word recognition in deaf individuals.


La loi de 1870 a donné au député qui a déposé le projet de loi, de manière qu'elle soit détaillée, une note.