What is This?
Two studies investigated the editing strategies used by college basic writing (BW) students as they went about correcting sentence-level errors in controlled editing tasks. One study involved simple word processing, and a second involved an interactive editor that supplemented the word-processing program, giving students feedback on their correction attempts and helping them focus on the errors. In both studies BW students showed two clearly different editing strategies, a consulting strategy in which grammatical rules were consulted and an intuiting strategy in which the sound of the text was assessed for "goodness" in a rather naturalistic way. Students consistently used their intuiting strategies more effectively; however, errors requiring consulting strategies showed a larger improvement after intervention by the interactive editor. Cognitive implications of the editing strategies are discussed in terms of the requisite knowledge involved in successful application of each strategy.

Editing Strategies and Error Correction in Basic Writing

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Much has been written about the systematicity of basic writers (BW)\textsuperscript{1} errors (Bartholomae, 1980; Hull, in press; Shaughnessy, 1977). By understanding this systematicity, writing instructors can gain new insight into student writing. However, instructors must do more than understand the source and systematicity of errors made by basic

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writers; they must teach these students strategies that enable them to correct those errors. To do that, writing instructors must look beyond error as the end product of some process, and they must look to the processes (i.e., strategies) required to detect and correct those errors.

We must realize, as Perl (1979) has pointed out, that basic writers are not completely without strategies when they enter the classroom. One BW student stated his basic strategy this way: "When all fails, stick a comma in and see what happens." Clearly, not all their strategies are worthy of cultivation and refinement through instruction, but there are data to suggest that BW students have some strategies that can serve them quite well, especially in the case of certain kinds of error.

INTUITING AND CONSULTING STRATEGIES

Hull (in press) identified two strategies that BW students frequently use in editing: an intuiting strategy, which students use when they check the sound of a piece of text when read, and a consulting strategy, which students use when they make reference to some learned rules of grammar, spelling, punctuation, and so on. (Hull also described a comprehending strategy, which students use when they find a problem in the meaning of a piece of text. This strategy might, however, be thought of as a special case of the intuiting strategy and is not discussed here.) These are far from all the strategies that BW students use while editing. They are, however, strategies that a large number of BW students bring with them to the classroom. Furthermore, when applied correctly by students, these strategies can be effective ways to edit certain errors. They are not, however, interchangeable options; certain errors lend themselves to correction via one strategy or the other. Given the sentence The building in which the children ran into, BW students can often "hear," or intuit, the syntactic problem, and they say things such as "That just doesn’t sound right" or "I’ll try to make that sound better." However, given the intended possessive phrase the genius’s word, students cannot detect the error by judging how the phrase sounds. Indeed, the phrase sounds fine. The apostrophe error can be detected only by consulting some rule about possession in nouns being marked by an apostrophe.
followed by s. In short, errors that can be corrected with the intuiting strategy are those that can be detected aurally given a true verbatim reading of the text (e.g., blurred syntactic patterns, incorrect word choice, missing words). That is, they violate lexical or syntactic constraints of the language. Errors that are amenable to the consulting strategy, on the other hand, violate only rules of written, not spoken, language (e.g., misspellings and incorrect punctuation, such as sentence boundary errors and missing apostrophes). Thus editing these errors requires knowledge of written language conventions, not just a native speaker’s linguistic intuitions.  

Using paper-and-pencil editing tasks, Hull (in press) found that BW students were better at correcting errors that required the intuiting strategy than errors requiring the consulting strategy. Since this was true for their own texts as well as for texts written by others, their advantage with the intuiting strategy cannot be discounted simply as students being able to detect problematic phrasings that they themselves never produce. Rather, the effect seems due to the different demands made by the two strategies. The consulting strategy demands referencing rules of standard written English, rules these students may not know because of their limited exposure to print. The intuiting strategy, on the other hand, involves a more “naturalistic,” holistic analysis of phrasing, a process that might more easily transfer from the students’ experience with spoken language.

If students’ differential success with the two strategies is due to the nature of the strategies themselves, the effect should be robust enough to replicate in various editing situations; but more important, such robustness would suggest that these strategies should perhaps be considered in editing instruction. The present studies were attempts to replicate Hull’s findings in different editing situations. They were carried out as part of a larger study of the effects of word processing and computer-assisted instruction on BW editing skills. Certainly, editing on a computer is different from editing on paper in many ways, two obvious differences being the printed format and the ease of editing. Not only does the student see printed text rather than handwritten scrawls but minor changes in the text no longer necessitate the burdensome chore of rewriting entire pages. If students’ strategies remain constant while the editing situation changes so markedly, we might validly argue that those strategies must be taken into account in writing instruction.
STUDY 1

Study 1 was a pilot study, designed to assess the impact of word processing on BW students and their writing. Prior to the beginning of the school term, BW students were given instruction on using word processors and were given access to microcomputers on which they wrote their class assignments. In addition, students were asked, three times during the fifteen-week term, to do special editing tasks using the word processors. The students were asked to complete one during the third week of the term, one during the seventh week, and one during the eleventh. The texts the students were to edit had been written by basic writers in previous terms, and they contained a variety of errors. An excerpt from one of the texts is presented in Figure 1. (Some changes had been made in the texts to equate errors across the three different texts, but the texts remained typical of student writing.) The students were instructed to correct errors in "spelling, punctuation, or typing" but not to concern themselves with "changes in word choice or paragraphing or the arrangement of sentences." That is, students were instructed to edit the texts, not to revise them.

The students viewed the texts on the CRT screen of a microcomputer and made their changes using the word processor that they used on their own assignments. Brief procedural checks were done to make sure that the students could successfully use the word processors to effect their changes. Even by the third week of the term, students were quite facile making the kinds of changes typically required in editing (adding text, removing text, rearranging text, and so on). While some students developed idiosyncratic procedures that were somewhat inelegant, all students were quite competent using the word processors.

Since participation was voluntary, not all students completed all editing tasks. Thirteen completed the first session, nine the second, and five the third. Due to the small number of students, statistical analyses were not performed on these data. The data consist of the percentage of text errors that the students detected and attempted to correct. While successful editing requires error correction as well as error detection, the data reflect editing attempts, regardless of their complete success. However, since so few error detections resulted in only partial corrections (fewer than 5% of the errors detected were not
Truly, one of most creative moments was one in which occurred in the spring of '76. My entire family went on a camping trip to Lost River, West Virginia. The campsite sat atop a large mountain, and we were surrounded by thick woods. The entire area was densely populated with large trees, many as old as 500 to 600 years. Not only was the area surrounded by bears as well.

The first few days were relatively uneventful. However, on the third night we were all awakened by a loud noise behind our tent. My father and I quickly rose to our feet to see what it was, sure enough, it was a large brown bear. Frightened out of my wits, I ran to the car. My father quickly woke my sister and mother as the bear ran past our tent and into the road. Quickly, I put the keys into the ignition and put the car into reverse, unknowingly hitting the bear.

Crazy as it sounds, we had a bear in which was stuck under our car. Unable to go forward or backward, we were all stupefied as to what to do. Suddenly, I had an idea . . . .

Figure 1: Excerpt from a Text that Students Were to Correct

corrected perfectly), the liberal scoring does little to distort the results.

The mean accuracy scores revealed less than perfect performance by the students. In session one, the group (n = 13) scored a mean of 54% correct across all error types. In session two, the group (n = 9) scored 62% correct, and in session three (n = 5), 52% correct. Because of possible self-selection factors influencing which students went on to complete session two, a second analysis was done to compare only the accuracy of students who completed both sessions one and two. The subset of nine students who completed both the first and second editing tasks scored similarly on each (62% correct on each). Thus the lower performance rate of session one reflects a lower scoring set of students who did not go on to complete session two.

Since only five students completed the third editing task, the data for this session should not be considered conclusive. Still, the apparent decrease in performance (down to 52% correct) was interesting. When the performance of the five students in session three was
compared with their performance in sessions one and two, small
differences remained (59% correct in sessions one and two compared
with 52% correct in session three). There is doubt whether this
decrease in performance should be taken seriously, but clearly there is
no increase in the students’ error correction across the term.

An analysis of Hull’s error categories provides some additional
insight. The three texts that the students edited contained several
types of errors (e.g., sentence boundary errors, syntactic errors,
missing verb inflections, missing apostrophes, misspellings, repeated
words, and word confusions). Some of these errors (especially
syntactic errors and word confusion) could be corrected using the
intuiting strategy, while others (notably misspellings and missing
apostrophes) could be corrected only by the students consulting a
rule. Students were more likely to correct intuiting errors than
consulting errors in the first two sessions (64% and 72% correct,
respectively, for intuiting errors compared with 56% and 54% correct
for consulting errors). This difference replicates Hull’s (in press)
findings.

For the five students who completed the third editing task, the
picture (tentative as it might be) looks somewhat different. In the
third session, overall performance decreased primarily due to
decreased performance on intuiting errors. Students corrected only
43% of the intuiting errors, while they corrected 57% of the consulting
errors. An examination of the performance of those five students in
editing sessions one and two revealed that in the earlier sessions they
had shown the same advantage with intuiting errors as had the rest of
the group. In sessions one and two, they had corrected a larger
percentage of intuiting errors (80% and 70%, respectively) than
consulting errors (46% and 54%). Thus their accuracy on intuiting
errors had decreased between the first two sessions (three and seven
weeks into the term) and the third session (eleven weeks into the
term).

Since it is based on so few subjects, such a result may need no
explanation. In addition, texts were not counterbalanced across
sessions, so the result may perhaps be due to increased difficulty of the
third text. Still, the pilot data were interesting enough to warrant
further investigation.
PROTOCOL SUPPORT

In order to see first-hand how students interacted with the word processors, we had followed a small number of these BW students throughout the term and had collected protocols as they worked on their own assignments and as they worked on the three editing tasks. Again, there is support in the protocols for different editing strategies being used by the students as they go about the editing task.

There were individual differences in how explicit students were about their use of the intuiting strategy. Some students, like HT (false initials), simply reread sections of text over and over, trying possible alternatives until the text sounded right. Consider HT as he read a section of text and mulled over a word confusion error: “got in my truck and took off so the guys in the engine wouldn’t respect . . . wouldn’t expect . . . wouldn’t suspect . . . wouldn’t suspect anything.” In contrast, other students were much more explicit of their use of the “sounds-okay” intuiting strategy, students such as MD whose protocol excerpt follows:

[reads from the text shown in Figure 1] campsite sat atop a large mountain. [to himself] That sounds okay. [reads] And we were surrounded by thick woods. The entire area was densely populated with large trees, many as old as 500 to 600 years. Not only was the area surrounded . . . not only the area . . . the area was also surrounded by bears . . . surrounded by bears. [Backs up] My entire family went on a camping trip to Lost River, West Virginia. The campsite sat atop a large mountain and we were surrounded by thick woods. The entire area was densely populated by large trees, many as old as 500 to 600 years. The area was also surrounded by . . . [to himself] something about that doesn’t sound right. . . .

While MD, like HT, reread often, he was more explicit in his use of the intuiting strategy, frequently saying things such as “Let’s see how it sounds” and “It doesn’t sound right at all” as he reread.

Both students also used the consulting strategy, and their protocol statements clearly distinguish the two strategies. For example, while considering an unnecessary comma, MD remarked “since it’s like two things, you don’t need a comma after that.” Similarly, HT’s statement, “I think high school is capitalized,” shows his reference to
rules and illustrates how the consulting strategy differs from the intuiting “sounds okay” strategy.

Since we followed only four students in protocol sessions, we again can point only to trends in the data. Still, a consistent picture emerges. Over the course of the term, students seemed to rely less on their “sounds okay” intuiting strategy and more on consulting strategies. MD was very explicit about his “sounds-okay” intuiting strategy in the third week of the term, but in later sessions his references to the sound of phrases decreased markedly. He still reread, but he no longer explicitly stated that he was checking how the text sounded. HT had been less explicit about his use of the intuiting strategy all along, but by the third session his editing behavior had changed. He had become very concerned with rules, especially rules concerning commas. In that session, he removed commas from adjective series and from before modifying phrases. He corrected two comma splice errors by replacing commas with periods, but he also created two sentence fragments when he did the same thing with commas that attached elaborative phrases to their main clauses. So despite HT’s increased concern with rules late in the term, he was still applying those rules with less than complete success.

Summary of Study 1

Combining the protocol evidence with the error correction data from the larger group, we can draw two conclusions. First, word processing alone did not dramatically alter BW students’ ability to edit errors in texts (and judging from student performance on the editing tasks in this study, neither did a writing course). There was no increase in the percentage of errors corrected between session one in the third week of the term and session three in the eleventh week. Second, Hull’s (in press) distinction between intuiting and consulting strategies was supported, both in terms of the different cognitive processes the two strategies employ and in the differential success BW students have in using them. As in Hull’s studies, BW students were more successful (in the first two sessions, at least) correcting intuiting errors than consulting errors.

A third point emerged from the data, but so far it is much more appropriately termed a “suggestion” rather than a “conclusion.” Students did not improve much in their use of consulting strategy by
the end of the term (they corrected about 56% of the consulting errors both at the beginning of the term and at the end), although the protocols suggest that they came to use the consulting strategy more. They became very attentive to rules and rule applications, even when they did not have a firm grasp of those rules. Furthermore, by the end of the term, students seemed to rely less on their intuitions strategies, thus replacing a strategy that they used relatively well with one they used less well. This is not to say that the intuitions strategy is all that students need to correct errors in their texts. The intuitions strategy cannot replace rule-consulting strategies, but it certainly can supplement them, especially with certain kinds of errors.

STUDY 2

Despite the problems of Study 1, we were enough intrigued by the data's suggestiveness to include a better-controlled version in a later study. In Study 2, we had BW students correct errors in two passages, one early in the term and one later in the term, again stressing editing over revision. The three texts from Study 1 were again used, this time counterbalanced across subjects and order of presentation. For Study 2, however, some slight modifications of the texts were made. Each text was edited so as to contain 16 errors, 8 intuitions errors (2 examples of 4 different intuitions errors) and 8 consulting errors (2 examples of 4 consulting errors).

By the time Study 2 was begun, we had designed an interactive editor that supplemented the word-processing program and gave students feedback on their changes as well as help in focusing on the error. The interactive editor is described in detail elsewhere (Hull & Smith, 1985; Smith, Hull, & McCutchen, 1985), so it is described here only briefly. As in Study 1, students viewed the text on the CRT screen of a microcomputer, and they effected their changes using a word processor with which they were familiar. (The interactive editor had embedded within it the word processor that students used throughout the term to prepare their class assignments.) Students were free to move through the text at will, making changes when they detected an error. When students attempted a correction, a message on the bottom of the screen informed them whether or not they had corrected the error, and when students made two incorrect changes of the same error, the
general area of the text pertinent to the error was highlighted in bold text on the computer screen. If on the third attempt students again failed to correct the error, a smaller segment of text was highlighted, further focusing students on the location of the error. If students failed to correct the error in four attempts, a correction was displayed for them, and they went on with the remainder of the text.

Thus Study 2 differed from Study 1 in that students used the interactive editor to help correct the errors in the texts. Also, the texts, presented this time in counterbalanced orders, were slightly modified to contain only 16 errors, 8 of which were clearly intuiting errors and 8 of which were consulting errors. Study 2 also involved enough students (34 students completed both editing tasks) so that statistical analyses were possible.

Of special interest was the effect of the interactive editor on students’ editing strategies. Certainly feedback on the accuracy of their changes should help students with editing of any sort, but would their intuiting and consulting strategies be affected equally? If students are less successful with the consulting strategy because they lack familiarity with many of the rules of written English, then highlighting the specific area of text containing the error may be especially useful in the case of consulting errors. While students may not have enough control over certain rules to monitor text for possible violations, when an area is highlighted as an error, students may be able to experiment with possible rule applications and, given feedback on those experimental changes, finally come up with the appropriate correction. However, aside from calling attention to a piece of text, highlighting may not be as helpful with the intuiting strategy. Highlighting may, in fact, force the student out of a holistic “sounds okay” intuiting strategy and into a rule consulting strategy. For intuiting errors this may be especially problematic, since the “rules” of syntax and phrasing are less accessible than those of punctuation and spelling.

Since students had four opportunities to correct each error, the error correction data can be analyzed in a variety of ways. Some, however, are more meaningful than others, and Table 1 presents the data partitioned in a way that may best answer the important questions. In this table, the data are presented by error type (consulting and intuiting) and by session. Within each session, however, the mean percentage correct (shown in parentheses) is partitioned into percentage of errors corrected on the first attempt.
TABLE 1
Percentage Error Corrections Made by BW Students

<table>
<thead>
<tr>
<th>Error Category</th>
<th>Session 1</th>
<th>Session 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No Help</td>
<td>+Help</td>
</tr>
<tr>
<td>Consulting</td>
<td>51.5</td>
<td>30.9</td>
</tr>
<tr>
<td>Intuiting</td>
<td>69.5</td>
<td>19.9</td>
</tr>
</tbody>
</table>

Mean by Session

85.9
87.5

(that is, before the student had any special help from the interactive editor with a particular error) and percentage corrected on attempts after the first (that is, after the student received all the help he or she needed to correct the error, not counting the computer-supplied corrections). The first mean in each cell (labeled No Help in Table 1) gives an indication of how well the students do on their own with the errors, while the second (labeled +Help) involves some indication of the helpfulness of the editor’s feedback and highlighting.

Two sets of data were submitted to an analysis of variance (ANOVA). The first analysis was performed on total percentage correct, that is, on the percentage of errors that the BW students corrected appropriately, regardless of whether they had help or corrected an error on the first try. As is evident in the means in Table 1, the only significant difference was between the two error types. Students were more successful correcting intuiting errors than consulting errors, F(1, 33) = 6.03, p < .05. They corrected 89.6% of the intuiting errors compared with 83.9% of the consulting errors. There was no difference, however, between the first and second sessions, F < 1. Students corrected 85.9% of the errors in the first session and 87.5% in the second. Also there was no interaction between error types and sessions, F < 1.

As Table 1 shows, student performance with no help from the interactive editor mirrors the analysis just reported, with differences between the error types but no differences between sessions. Without help from the interactive editor, the overall level of performance was lower, 51.5% correction rate with consulting errors and 69.5% correction rate with intuiting errors, but this is comparable to the
performance of students in Study 1, who also had no help with the editing task. Thus with no help, these students perform much like those in Study 1.

The percentage of errors corrected with help, however, shows a somewhat different picture, and these data were submitted to a second analysis of variance. Again, there was no difference between the two sessions, $F < 1$, but there was a difference between the error types, this time in the opposite direction. Help from the interactive editor was more beneficial to the students in the case of consulting errors, $F(1, 33) = 11.7$, $p < .01$. With the editor’s help, students corrected an additional 29.8% of the consulting errors, while they corrected only an additional 20.2% of the intuiting errors. It should be noted that, because of students’ higher initial success with intuiting errors, there were fewer intuiting errors remaining to be corrected in subsequent attempts. However, since students’ 89.6% total accuracy rate with intuiting errors was still well below perfect performance, the difference between intuiting and consulting errors does not seem entirely due to a ceiling effect. Thus, as we initially suspected, feedback from the interactive editor may be more beneficial in students’ successive attempts to correct consulting errors.

Summary of Study 2

The most striking result of Study 2 was the improvement in students’ error correction given the help of the interactive editor. Students corrected 60% of the errors (summed across the two error types) with no help from the interactive editor and nearly 86% with help when needed. Feedback usually improves performance, and this generality held true in these editing tasks. This result seems more striking, however, when we recall that the feedback consisted only of highlighting error locations, not in providing information on how errors might be corrected. Again, this finding replicates Hull (in press). There still was no improvement in error correction across the two sessions, but once again there was a clear difference in students’ success with intuiting and consulting errors. Students were significantly more accurate correcting intuiting errors. An especially important benefit of the interactive editor, however, is the aid it gives students with consulting errors, the errors with which they have the most trouble when left with only their own strategies and no feedback.
GENERAL CONCLUSIONS

In two studies, with two very different procedures, we have seen evidence of two strategies at work as BW students go about correcting sentence-level errors. One strategy (intuiting) seems more tied to native speakers' linguistic intuitions about the form and structure of their language, while another strategy (consulting) relies more on knowledge of the conventions of standard written English—knowledge that is typically acquired through experience with formal written language. Given the distinction between the knowledge required by the two strategies, it is not surprising that BW students are less successful editing consulting errors than intuiting errors. Basic writers often have had insufficient experience with print and, as a result, may have impoverished knowledge of the written conventions required for successful application of the consulting strategy. These students are, however, native speakers of English for the most part, and thus have adequate knowledge (albeit primarily implicit) of the linguistic structures required for successful application of the intuiting strategy. Thus students' knowledge of oral language more easily maps into the intuiting strategy.

In light of the data from the two studies reported here, some interesting speculations can be offered concerning student editing strategies and instruction. Much of what goes on in a BW classroom is devoted to acquainting students, at least implicitly, with the rules and conventions of written English. This seems appropriate, especially since students' rule-consulting strategies are the ones they use with least success. The results of Study 1, however, suggest that the classroom emphasis on consulting strategies does not necessarily improve students' performance with those strategies. There remains much room for improvement in students' correction of consulting errors, and the results of Study 2 suggest that our computer-assisted instruction, while generally helpful, is especially helpful in increasing students' success with consulting errors.

Students come into the classroom, however, also possessing an intuiting strategy for editing that involves checking whether a text "sounds okay" based on general linguistic intuitions. This strategy is effective in detecting certain kinds of errors, but our protocols suggest that during the course of their writing instruction (and perhaps because of that instruction), students may come to focus more and more on their consulting strategies, sometimes to the neglect of their intuiting strategies.
We should take care that we are not unwittingly discouraging students from using the intuiting strategy to exploit the linguistic knowledge they possess as native speakers, thereby taking away one tool that they already use with some success (albeit in limited contexts). Successful editing requires attention to multiple levels of text; thus both intuiting and consulting strategies can be useful to writing students. Rather than present the rule-based consulting strategy to students as an alternative editing strategy, perhaps writing instruction should present the consulting strategy as an additional strategy. Instruction might then help students improve intuiting strategies as well as consulting strategies, while also helping students recognize appropriate contexts for each. In that way, writing instruction could provide students with strategies to deal with one level of error while also improving strategies they already possess to deal with another level of error.

Furthermore, this analysis of editing strategies provides one example of how we might think about the cognitive processes and requisite knowledge involved in writing (in this case, editing in particular). By moving beyond the errors themselves to the processes involved in correcting them (or even producing them), we might better inform students about the process of writing and learning to write, rather than simply respond to their written products. Our interactive editor, which helps model for students the close reading required during editing, might be considered a step in this process-focused direction. Enabling students to fine-tune editing strategies that they seem to use naturally might be another.

NOTES

1. We are aware that “basic writer” is a label that has different meanings depending on who is using it. However, lacking a better term, we adopt it in this article to mean those students who come to college underprepared for the writing tasks they encounter. The basic writing students who were subjects in studies we report here scored a 2 on a 4-point holistic scale in a university’s timed-writing placement test.

2. Within this discussion we will refer to intuiting errors and consulting errors, but these are merely shorthand references. These errors should be understood in terms of the strategies adequate to correct them—intuiting strategies in one case and consulting strategies in the other. Our focus, then, is on the editing strategy rather than the error. These two sorts of errors certainly do not account for all the errors that students make, nor are they necessarily mutually exclusive, except in our experimental materials.
However, errors amenable to these two strategies do account for a sizable proportion of the errors BW students make. Thus helping students to apply these strategies successfully could go a long way in helping students edit sentence level errors.

3. It could be that with a term of writing instruction, students did improve in editing their own writing, but that the improvement did not transfer to the editing tasks we presented to them. This runs counter, however, to Hull’s (in press) finding that BW students were more successful correcting errors in texts by other writers.

4. The interactive editor described here developed out of the collaborative work of many researchers from the University of Pittsburgh departments of English, linguistics, and psychology and from the Learning Research and Development Center.

5. Certainly this does not hold for those students in BW classrooms whose native language is something other than English. These students have knowledge of other linguistic structures, and this knowledge frequently affects their writing of English (sometimes adversely).

REFERENCES


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