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ABSTRACT

To determine how writers who differ in editing performance respond to operationally defined categories of errors in different kinds of written texts, a study asked novice and expert editors to correct and comment upon three kinds of error (consulting, intuiting, and comprehending) in two tasks (a self-written essay and three essays written by others) under two conditions (feedback on error location and no feedback). Subjects were chosen from two populations of undergraduate students who differed in their error-correction performance, yet were similar in age and educational level. The essay topic for the self-written essay directed subjects to describe a personal experience and to generalize on the basis of that experience. The standard essays were adapted from essays that originally had been written by incoming freshmen as placement exams, on similarly structured describe/generalize topics. Results showed that: the expert editors did not correct all errors in the tasks, even with feedback on error locus; they did not distinguish between matters of correctness and matters of style and taste and judgment; they did not operate entirely by a set of conventional rules for editing; and, proportionally, they were no better than were the novices in correcting errors in their own writing. (HOD)

The Editing Process in Writing: A Performance Study of Experts and Novices

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THE EDITING PROCESS IN WRITING:

A PERFORMANCE STUDY OF EXPERTS AND NOVICES

INTRODUCTION

Over one hundred years ago Harvard President Charles W. Eliot complained that "bad spelling, incorrectness as well as inelegance of expression in writing, [and] ignorance of the simplest rules ... of punctuation are far from rare among young men of eighteen" (in Hook, 1979, p.8). In more recent assessments of the writing of young men and young women of various ages, the conclusions are mixed. The National Assessment of Education in Progress (*Writing Mechanics*, 1975) has shown that many students have apparently mastered the "mechanics" of writing to judge from the low frequencies of such errors in their writing. These reports also reveal, however, that for certain other students, sentence-level error figures as a freqent and serious writing problem. In fact, the National Assessment (*Writing Achievement*, 1980), has identified two distinct populations of seventeen-year-olds based on an analysis of writing mechanics: one which "appears to have a general, though imperfect, grasp of written language," and another which "appears to be virtually lost" (p. 44). (For related evidence, see Kitzhaber, 1963; Shaughnessy, 1977; and Stewart & Grobe, 1979).

Given evidence that correctness in writing has long eluded certain students at various grade levels, one might expect an equally long tradition of research aimed at remediating those errors or ascertaining why they persist. And there has been a great deal of research, some of it beginning around the turn of the century (cf. Lyman, 1929). However, the early work dealt with error only peripherally--in order to document its frequency so as to inform instruction in grammar and usage, or in order to test the efficacy of one kind of grammar instruction over another. Much research on error today uses a similar methodology: the errors found in students' papers are tabulated and classified according to traditional handbook categories, the purpose being simply to describe the errors that students make and correct (e.g., Bridwell, 1981; Cooper et al., 1984; Freedman and Pringle, 1980.) There has been little interest historically in any direct study of why students make sentence-level errors in their writing or how they learn to correct them, perhaps because the answers to such questions have appeared so self-evident as to be commonsensical: writers make errors out of a simple ignorance of grammar rules or a carelessness; they

learn not to make them through grammar practice and drills--"common sense" assumptions which are not, however, supported by empirical evidence.

Recent research has shown that there are other causes for error in writing besides ignorance and carelessness. Influenced by work on child language acquisition and second language learning, writing specialists like Kroll and Schafer (1978) and Shaughnessy (1977) have demonstrated that, by carefully analyzing a writer's text, one can identify patterns of error which reveal the consistent application of erroneous rules and which thereby imply rule-governed and intelligent behavior on the part of the writer--a significant departure from previous causal assumptions. Other researchers have preferred to ascribe the causes of sentence-level error to the limits of the human information-processing system. Most notably, Daiute's (1981) work demonstrates how constraints imposed by short term memory may lead to errors and also impede error detection and correction.

Unfortunately, as second language researchers have begun to discover, much research on causes of error faces serious methodological problems (Schachter and Celce-Murcia, 1977). It is very difficult to determine with any assurance exactly why a writer made a particular error, especially, as Bartholomae (1980) has illustrated, by means of one methodology, most typically an *ex post facto* analysis of texts. The same error might be caused by lack of knowledge about a particular writing convention; it might be an accident, a slip of the pen; or it could represent an interaction of several causes. Less fortunate still, we have yet to establish an explicit relationship between causality and remediation. That is, knowing why a writer made a sentence-level error may or may not be useful in teaching him to correct it. Although some error analysts prescribe detailed treatments for errors (e.g., Shaughnessy, 1977; Laurence, 1975), others offer advice so general as to be of limited usefulness. Carkeet (1977), for example, commented after his discussion of syntax errors that "instruction in this area simply involves a kind of facilitation, where the instructor helps the student to rely on sharpened grammatical intuition" (p. 695).

It would appear, if we are finally to develop a pedagogy for error, that research from an additional perspective is called for--research on error *correction*. It seems unlikely that we will determine the best technique for teaching editing, be it grammar instruction or otherwise, until we know something about the processes involved, not only in error commission, which is but a piece of the whole, but the processes involved in error detection and alteration as well. I am suggesting, then, that a useful and even necessary accompaniment to research aimed at

ascertaining why writers make sentence-level errors is research aimed at ascertaining how writers correct sentence-level errors. In the present study, my purpose is to investigate the process of error detection/correction.

Research from this perspective requires, however, that currently used methodologies for collecting and analyzing error data be refined. It has not, for example, been common to compare types of tasks in error research. Rather, researchers have relied upon students' essays as their test instruments--papers written either in a timed-writing, test situation (e.g., Daiute, 1981) or as regular assignments in a composition course (Hjelmervik, 1982). Bartlett (1982), however, has shown that students perform better when editing someone else's writing than when editing their own. Her research thereby illustrates the advantage of comparing performance on two tasks, editing one's own writing and editing standard essays in which errors of particular types are planted. If writers are better able to correct one kind of error in a standard text than in a self-written text, but perform equally well on both texts when correcting some other kind of error, then something can be learned about the nature of error correction that would not be apparent had performance been tested on one task alone.

However, typical data collection methods--asking students to write or edit an essay and analyzing it *ex post facto*--would not by themselves allow me to investigate the process of detection and correction. To collect data on strategies and intentions, textual analyses need to be supplemented by protocol analyses (cf. Hayes and Flower, 1983). And, because students might fail to correct an error simply because they didn't happen to notice it, a way was also needed to facilitate error detection. One such method is to test error correction performance under two conditions, one in which students work on their own and one in which students are given feedback on the location of errors.

Error correction performance may vary as a function of ability level or experience as well as a function of task and condition. Thus, describing the performance only of poorer writers (e.g., Perl, 1979) provides limited information, for no inference can be made about how these "novices" differ, in performance or process, from "experts" (cf. Sommers, 1978, and Voss et al., in press). By comparing experts and novices, it would be possible, not only to determine such differences, but to infer as well how novices might become experts.

Finally, because error categories themselves are fuzzy and problematic (cf. Cooper et al., 1984

and Bartholomae, 1980), and because different errors seem to provoke different correction strategies (Bartlett, 1982; Nystrand, 1982), for the present research I devised a more comprehensive, context-dependent error taxonomy, one based not on handbook categories, but on the operations a writer must perform to correct an error:

1. *consulting*--in order to correct an error, a writer must call upon his knowledge of the conventions of written language.

2. *intuiting*--in order to correct an error, a writer must sense or "hear" that something is wrong with the text, although he cannot state a rule for the problem, and although he understands the text in spite of the error he perceives;

3. *comprehending*--in order to correct an error, a writer must perceive that something is wrong with the meaning of the text;

Purpose and Design

The present study was designed to determine how writers who differ in editing performance respond to operationally-defined categories of errors in different kinds of written texts. Two groups of writers (novice and expert editors) corrected and commented upon three kinds of error (consulting, intuiting, and comprehending) in two tasks (a self-written essay and three essays written by others) under two conditions (feedback on error location and no feedback). The major questions addressed were:

1. Do novice and expert editors differ in their error correcton performance, and if so, how do they differ?

2. Does performance differ a a function of task (self-written essay, standard essays), and if so, how does it differ?

3. Does performance differ as a function of conditions (feedback on error location, no feedback), and if so, how does it differ?

METHODOLOGY

Subjects

Subjects were chosen from two populations of undergraduates who differed in their error-correction performance, yet were similar in age and educational level:

1. students enrolled in basic writing classes at an urban university who wrote two timed, impromptu essays (a placement essay administered as part of admission to the university, and a diagnostic essay written the first week of class in basic writing as a check on the placement essay), both of which contained intuiting, comprehending, and consulting errors.

2. students enrolled in composition classes other than basic writing at the same university, who wrote one timed, impromptu essay (the diagnostic essay) which contained none of the above-mentioned types of error.

The subject sample drawn from these two populations consisted of thirteen novices and eleven experts.

Test Instruments

Two test instruments were used: self-written essays and standard essays. The essay topic for the self-written essay directed subjects to describe a personal experience and to generalize on the basis of that experience. This describe/generalize format had been used regularly to structure placement essays required for college admission. Specifically, the assignment read:

> All of us have, at some time in our lives, taken a risk in order to accomplish a goal. I'd like you to begin your essay by writing about a time when you have taken such a risk. Explain why you took it and what the results were. Then, based on what you've written, draw some conclusions about what is involved, in general, when people take risks.

The standard essays (see Figure 1) were adapted from essays that orginally had been written by incoming freshmen as placement exams, on similarly structured describe/generalize topics. All sentence level errors were corrected in the three standard texts, and minor adjustments were made to ensure that each essay was the same length, approximately 250 words or one and one-

fourth typed pages when double-spaced. This length was chosen purposefully; it is more than could appear on one typed page and thus made the texts appear more like a realistic editing exercise and less like a textbook drill.

FIGURE 1

Example of a Standard Essay

A CONSULTING error appears in line 10; an INTUITING error appears in lines 14 and 15; a COMPREHENDING error appears in line 21.

"Very bad" is too mild a rating for the man who was my senior organic chemistry teacher, Dr. Ivan Lesgold. I would guess his age to be about sixty, but his theories had to have been much older than his age. This German horror could have gone to school in the Dark Ages.

Although Dr. Lesgold considered himself a scientist, he seemed to me to have tunnel vision. Our organic chemistry book, for example, said that insulin consisted of fifty-one amino acids. Lesgold said there were only forty-eight. The omnisicent Doctor had spoken, and our class grudgingly accepted this geniuses word.

Dr. Lesgold's class was a study in confusion. He would start at the back of a chapter, skip to the middle, and then to the front. (Chronological order must be too easy for powerful brains.) I think that by adding to the confusion was the fact that Dr. Lesgold had an inferiority complex: he was always trying to prove he was right. The Doctor claimed that he could solve everything that ailed the world if he just had the right equipment. But for some unknown reason he was not smart enough to set up the electronic balance the school had bought for him a year before.

Dr. Lesgold was able to devise a way to deprive our senior class of the highlight of senior year. However, every year the biology class had gone to the anatomy lab at Pitt to see the medical students work on cadavers. My senior year would have been no exception, but Dr. Lesgold scheduled the trip on Senior Skip

Day, knowing all too well none of the senior class would attend.

To be fair, I have to admit that Dr. Lesgold always thought he was doing the right thing. Even though most of me thoroughly dislikes the guy, a small portion of me has to admire the man for his dedication in teaching so long in a place where he apparently was not appreciated by anyone.

I believe that good teaching involves developing pupils' ideas, not force-feeding teachers' ideas to the students. In the "Lesgoldian" method of teaching, there was no willingness to compromise or to listen to the blasphemous students who dared to challenge the edicts of Ivan. Teachers should try to expand their pupils' horizons; instead, Lesgold only narrowed ours.

Three kinds of errors were planted in each text: one consulting error, one intuiting error, and one comprehending error. Each error type was placed in one of the essays approximately fifty words from the beginning of the text. The two errors not occurring initially appeared in variable positions to ensure that subjects who found all three errors in one essay would not be reinforced for looking in the same places for the same errors in subsequent essays. Since each category of error would be represented once in each standard essay and thus be presented to each subject a total of three times, it would have been possible to vary the specific type of error used to represent the three general categories. However, to standardize the tasks, the same error type was used to represent the categories in all three standard passages.

The error chosen to represent the consulting category was a variety of spelling error and can be illustrated by the phrase, ***this geniuses word.*** (Cf. Figure 1, line 10). Correction requires the application of a rule for showing singular possession. The error chosen to represent the intuiting category was what Mina Shaughnessy (1977) called a ***blurred pattern***, as in this example: ***I think that by adding to the confusion was the fact that Dr. Lesgold has an inferiority complex.*** (Cf. Figure 1, lines 14 and 15.) This kind of error presumably occurs when a writer begins to compose one sentence pattern, but loses track of its syntax and merges it halfway through with another sentence pattern. To correct it, a writer wouldn't be likely to call up an explicit rule but would "hear" something wrong in the sentence. The error chosen to represent the comprehending category was a misplaced ***however*** and can be illustrated with the following sentences: ***[Dr. Lesgold] was not smart enough to set up the electronic balance the school had bought for him a***

year before. Dr. Lesgold was able to devise a way to deprive our senior class of the highlight of senior year. However, every year the biology class had gone to the anatomy lab a Pitt to see the medical students work on cadavers. (Cf. Figure 1, lines 17-23.) The third sentence does not logically follow the second unless the *however* is deleted or moved to the second sentence. To correct the mistake a writer thus must do more than listen to determine whether a sentence "sounds right" or to watch for violated conventions; he or she must pay attention to meaning as it develops between sentences.

Test Procedure

For both tasks, each subject was instructed to 1) read the text silently until he reached an error or something that needed changing, 2) make the change or correction on the page, and 3) explain aloud why he made the change or correction. At this point, the experimenter was free to intervene by asking questions in order to clarify the writer's explanation or to encourage her to try to explain her correction further. When subjects miscorrected--that is, when they identified as an error something that was correct, or when their attempt to correct an error did not succeed--they were still allowed to make whatever change they had begun.

The error correction tasks were counterbalanced for each group. For half of the subjects in each group, the standard essays comprised the first task and one session of the study. For the other half, the first task consisted of writing an essay and then correcing it. Each session took place in a small conference room equipped with a table and chairs.

The standard texts were presented in random order to each subject in one session. This session began with the subject reading a set of written instructions on how the session would proceed. These instructions had been piloted to determine the kind of language that would lead students to make editing changes rather than revisions. Each subject was encouraged to question anything that seemed unclear in the instructions. The experimenter sat across from the subject, noting his or her editing changes on a copy of the standard tasks.

For the self-written essay, each subject was provided written instructions, a tablet of paper, and a multi-colored pen. The instruction sheet illustrated how each draft was to be written in a different color of ink, and how a thin line should be drawn through deletions or changes. Writers were encouraged to spend as much time as they needed in order to write the best essay that they

could. They were also encouraged to write as they normally would. Specifically, they weren't to feel compelled to produce several drafts if this weren't the way they usually composed. After these instructions, the subject was left alone in the conference room to compose his essay. As previously arranged, he signalled when as he had written his last draft but before he has read over it for the last time. A copy was made of the final draft, and the student read a set of written instructions identical to those provided for the editing of the standard essays except for changes necessitated by the difference in task. After reading the instructions, the student corrected his own essay using the same procedure as for correcting the standard texts.

The editing tasks were carried out under two conditions--feedback and no feedback. Prior to the feedback conditions, the location of errors that the subjects had missed was highlighted with a yellow marker. The amount of text that was highlighted varied according to error type, but was never less than one sentence and never more than five. Armed with this information on locus, students tried again. Every error missed by the experts was covered in this session, but because the novices missed many more errors, usually only one error from each of the three categories was presented to them. The conditions were purposefully not counterbalanced (the non-feedback condition always occurring first) in order to determine first which errors subjects could correct on their own.

These procedures allowed for the collection of two kinds of data: 1) written responses to error and 2) oral comments on those responses.

Data Analysis

For the self-written essays, the errors that writers made were identified by two raters (inter-rater reliability was .90). These errors were then categorized as ***consulting***, ***intuiting***, or ***comprehending*** (inter-rater reliability for this classification, calculated for twenty percent of the errors, was .94.) (Means and standard deviations for errors made are provided in Table 1.) Last, it was determined which errors the writers had corrected. Similar procedures were carried out for the standard essays. The quantitative data collected from the analyses of the self-written and standard essays were used to answer the research questions.

To facilitate analysis of the protocol data, the typed transcripts of subjects' comments were divided into "episodes," each episode consisting of the comments a subject made about a

particular error. An analysis of these comments provided additional information about error correction and suggested directions for interpreting the quantitative findings.

TABLE 1

MEAN ERRORS MADE ON SELF-WRITTEN TASK

BY GROUPS AND CATEGORIES

		Consulting	Intuiting	Comprehending	SUM
NOVICE	M	20.54	3.23	3.46	27.13
(N=13)	SD	12.75	4.15	3.37	19.22
EXPERT	M	6.41	.75	.83	8.00
(N=11)	SD	8.80	1.06	.83	4.18

RESULTS

Quantitative Analysis

Results will be presented for the total number of errors corrected (sum error) and for the number of errors corrected in each of the three error categories (consulting, intuiting, and comprehending).

Sum Error

For sum error, the proportion of the total errors each subject corrected was calculated. These proportions were analyzed by means of a three-way ANOVA, repeated measures on two factors. All three main effects were significant. (See Table 2 for means and standard deviations.)

TABLE 2

MEAN PERCENTAGE OF SUM ERROR CORRECTED BY GROUPS, TASKS, AND CONDITIONS

		Self-Written		Standard	
		No Feedback	Feedback	No Feedback	Feedback
NOVICE	M	11	34	23	51
(N=13)	SD	9	22	13	18
EXPERT	M	10	46	54	62
(N=11)	SD	12	28	19	25

The groups differed in overall performance, with the experts correcting more errors than the novices, independent of tasks or conditions ($F=10.69$; $df=1,22$; $p<.005$). The subjects performed differently on the tasks, correcting significantly more errors in the standard essays than in the self-written ones ($F=70.19$; $df=1,22$; $p<.001$). And they performed differently as a function of condition, correcting significantly more errors in the feedback condition than in the non-feedback condition ($F=27.39$; $df=1,22$; $p<.001$). (See Figure 2.)

Based on these data for sum error, one would expect, for the individual error categories, (1) experts to out-perform novices, (2) each group to perform better on the standard essays than the self-written ones, and (3) each group to perform better in the feedback condition. In large part, the data confirm these expectations.

Error Categories

The data on the number of errors that subjects corrected in each of the three error categories are presented in terms of the mean percentage corrected. Since some experts did not make any errors in some of the categories on the self-written task, and corrected all the errors in the standard texts during the non-feedback condition, a number of empty cells resulted, making it inadvisable to test these data for statistical significance. (See Tables 3, 4, and 5 for means and standard deviations.)

TABLE 3

MEAN PERCENTAGE OF CONSULTING ERRORS CORRECTED BY GROUPS, TASKS AND CONDITIONS

		Self-Written		Standard	
		No Feedback	Feedback	No Feedback	Feedback
NOVICE	M	8	32	5	45
	SD	10	22	12	25
	N	13	13	13	13
EXPERT	M	7	48	53	86
	SD	11	33	36	24
	N	11	11	12	7

The groups differed overall in the number of *consulting* errors they corrected, with experts averaging 49% and novices averaging 23%. Performance also differed as a function of task, there

being more consulting errors corrected on the standard task than the self-written--47% compared to 24%. Performance differed as well as a function of feedback, with more consulting errors corrected in the feedback condition--53% as compared to 18%. (See Figure 3.)

FIGURE 2

Percentage of Sum Error Corrected
By Groups, Tasks, and Conditions

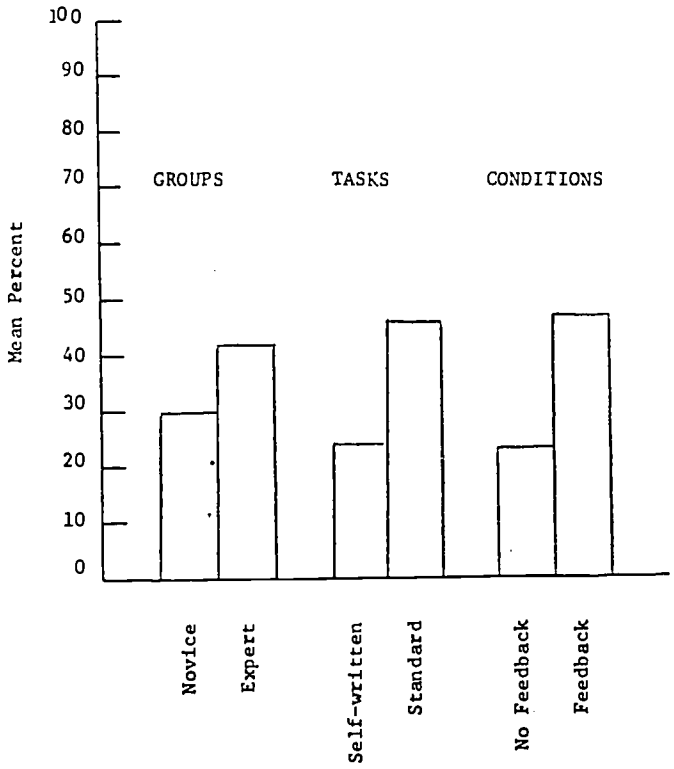
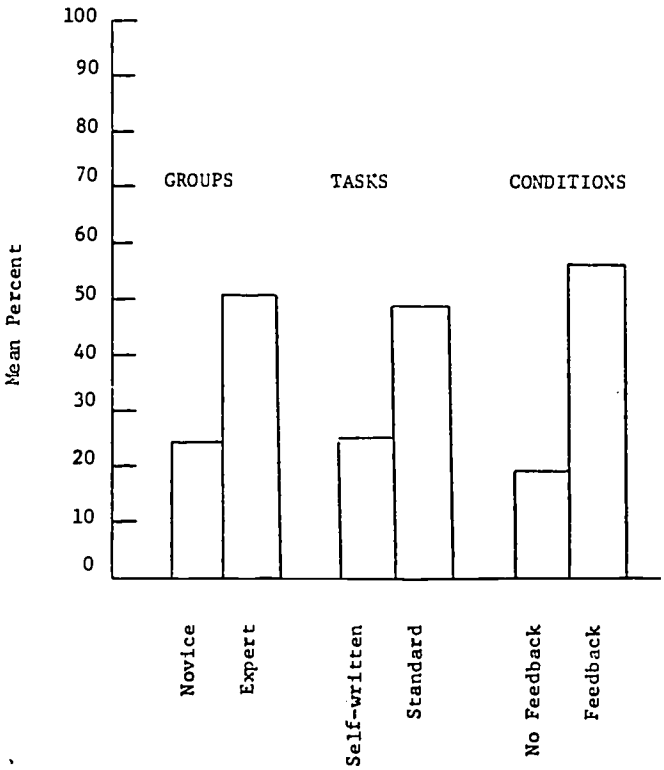


FIGURE 3

Percentage of Consulting Errors Corrected
By Groups, Tasks, and Conditions



The groups differed overall in the number of ***intuiting*** errors they corrected, with experts correcting 56% and novices, 38%. Performance differed as well as a function of condition, with more intuiting errors corrected in the feedback condition (58% as opposed to 36%.) However, performance did not differ as a function of task. (See Figure 4.)

For ***comprehending*** errors, the groups differed in overall performance only slightly, with experts averaging 31% and novices averaging 35%. Performance differed markedly, however, as a function of task: subjects averaged a 52% correction rate on the standard essays, but only 14% on the self-written essays. And it differed as well as a function of condition: subjects averaged a 40% correction rate with feedback, but only 26% without. (See Figure 5.)

TABLE 4

MEAN PERCENTAGE OF INTUITING ERRORS CORRECTED BY GROUPS, TASKS, AND CONDITIONS

		Self-Written		Standard	
		No Feedback	Feedback	No Feedback	Feedback
NOVICE	M	25	63	18	46
	SD	32	48	22	24
	N	11	9	13	13
EXPERT	M	36	63	66	60
	SD	43	48	25	46
	N	6	4	12	19

TABLE 5

MEAN PERCENTAGE OF COMPREHENDING ERRURS CORRECTED BY GROUPS, TASKS, AND CONDITIONS

		Self-Written		Standard	
		No Feedback	Feedback	No Feedback	Feedback
NOVICE	M	10	22	46	62
	SD	17	36	29	44
	N	13	9	13	11
EXPERT	M	0	25	47	62
	SD	0	42	33	2
	N	7	6	12	11

Thus, the results for individual errors indicate that experts corrected more errors than novices, with the exception of comprehending errors; that performance on the standard essays was generally better than performance on the self-written essays, with the exception of intutiting errors; and that performance with feedback was consistently better than performance without feedback, with no exceptions.

FIGURE 4

Percentage of Intuiting Errors Corrected
By Groups, Tasks, and Conditions

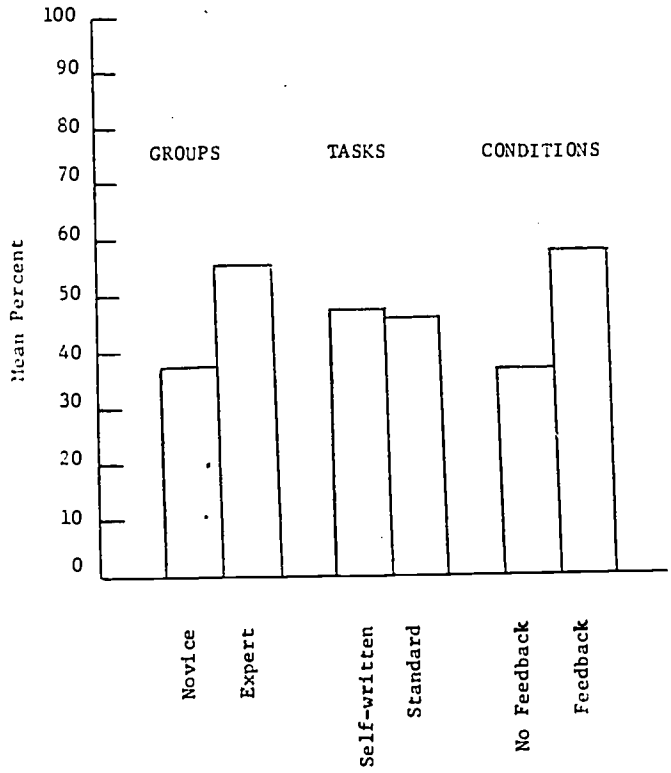
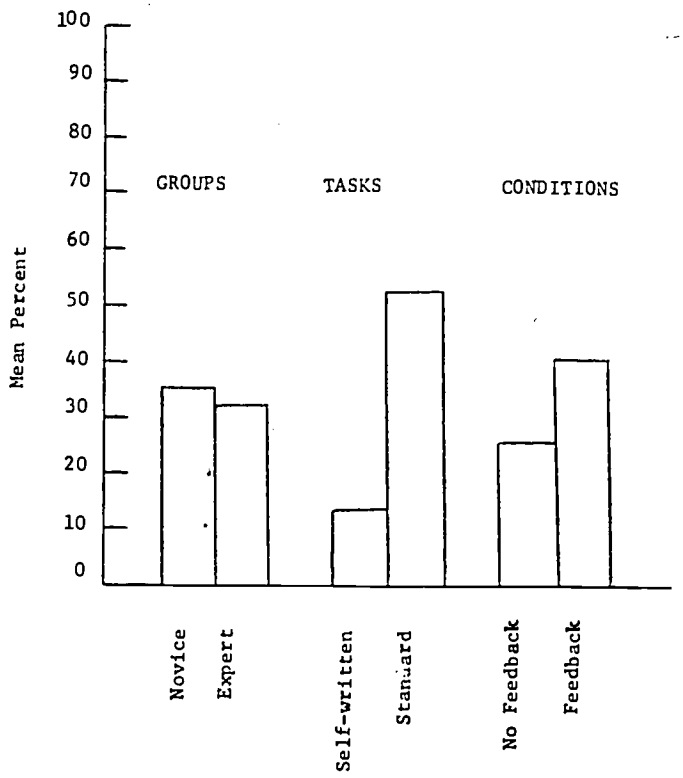


FIGURE 5

Percentage of Comprehending Errors Corrected
By Groups, Tasks, and Conditions



Protocol Analysis

The results from these analyses are organized around issues raised by the quantitative data.

Tasks

The quantitative data suggest that the two groups more closely paralleled one another's error correction performance on the self-written essay than on the standard essays. The protocol data reveal that experts found few things amiss in their papers and read without much comment; the same was true for novices. However, both groups found much more to comment on when editing the standard essays. In this task experts unhesitantly applied a battery of rules on matters of taste and style as well as matters of grammar and usage. Novices, however, demonstrated a much more limited repertoire of sentence-level rules and, instead of attending to correctness, questioned the essays' literal meaning, their truthfulness, or persuasiveness. One student, for example, objected to a sentence which said that a teacher had narrowed his students' horizons (see Figure 1, lines 35-36) by noting, "I think they learned more than they think they did. I don't

see how he could narrow your horizons." Novices were, however, often thwarted in their attempts to clarify meaning, for they were apt to mis-read and mis-interpret, even on a literal level.

Conditions

The quantitative data indicated that both groups of subjects improved their correction rates in the feedback condition. However, the protocol data suggest that, while providing feedback on error location aids novices and experts alike, it does so in somewhat different ways. Experts, when they knew the general location of an error, were able to apply their editing skills and their knowledge about rules in a problem-solving kind of way. They typically studied the highlighted passage and experimented with a correction until they suddenly knew they had discovered the error or knew that they wouldn't discover the error. And they often explained why they might have overlooked the error to begin with. One expert commented on the phrase, *ladies role*: "Apostrophe. I think what happens is when you see the *ies*, instead of just *s*, you don't notice to stick on an apostrophe." Providing feedback on locus seemed to inhibit novices from commenting on literal meaning and to encourage them to apply rules. However, instead of treating errors as problems to solve, they simply guessed at possible corrections, starting usually with spelling and commas. Often, on second guess or with prompting, they were able to make corrections.

Error Categories

The quantitative data demonstrate a difference in the proportion of errors writers were able to correct from three categories--consulting, intuiting, and comprehending. The protocol data shed light on the nature of these differences.

The language used by writers to describe errors and to propose corrections for them was often distinct for each error category. For the consulting category, writers spoke in terms of *need* and *requirement*, as in the following example, where a writer corrects an error in possessive which appeared in the sentence, *The omniscient Doctor had spoken, and our class grudgingly accepted this geniuses word.*

- Strike that *e*--apostrophe. My freshman high school teacher was a woman who made Captain Bly seem like Florence Nightingale, and she would have hanged anyone who handed in something like that.

In contrast, when correcting intuiting errors, writers almost never tried to state a rule and

seldom appeared so certain that a particular thing must be changed. Instead, they spoke of a sentence's "sounding" wrong and went on to experiment, attempting to find the wording they wanted. In the following example, a writer corrects a blurred pattern occuring in the sentence, *I think by breaking the stereotypical mold of the woman at home and in the kitchen demonstrates one way women can achieve equality.*

- Uh, maybe 17--lines 17. (reads) *I think by breaking the stereotypical. I think by breaking the stereotypical mold.* Well, *I think--that by.* Yeah, put in a *that.* That's not really a major thing. Ummm, maybe I'm not familiar with the word. I didn't know, uh, I never use *stereotypical.* I use *stereotypic.* I think I'd like to go without the *al.* (reads sentence again) Let's get rid of the *by.* (reads again) That was very tricky.

When writers attempted to correct comprehending errors, they talked, not about how the text sounded or what rules to apply, but about what the text meant or didn't mean, as in the following example where a writer noticed the dissonance produced by a misplaced *however* in the sentences: *Dr. Lesgold was able to devise a way to deprive our senior class of the highlight of senior year. However, every year the biology class had gone to the anatomy lab at Pitt to see medical students work on cadavers.*

- I'm not sure, on line 21. I don't understand why there would be a *however.* Something is wrong. I'd just lay it aside for now. I don't know what else I'd....Uh, well, it says *he was able to devise a way to deprive our senior class of the highlight of senior year.* And then, *however.* Okay, so it sounds like he's gonna deprive the class, but, then something is gonna happen to almost save them, so I wasn't expecting to hear that.

These excerpts thus shed light on the nature of the differences which showed up in the quantitative analyses. Writers described their correction activities differently depending on which kind of error they were attempting to correct. These differences in language provide, then, additional evidence that the three error categories elicit different correction strategies.

Comprehending Category

The quantitative data showed that the experts fared better than the novices on most tasks and conditions, with one exception: on the standard essays, no-feedback condition, the novices corrected more comprehending errors (the misplaced *however*'s) than did the experts. The

protocol data provide an explanation for this exception. One novice, for example, commented after he had read a standard essay, "I tell you, there's just a lot of *however's* in here." He pointed to sentences and read, "*However, however*. It's just--like words thrown in. I try to limit *however's* myself." And he crossed out two *however's* from the standard essay. Other novices corrected the misplaced *however's* by means of idiosyncratic rules, such as "never end a sentence with *however*." Thus, novices corrected comprehending errors, but often inadvertently or by chance. Any conclusions to be drawn from the quantitative data concerning their performance on this category as compared to the experts' must, then, be qualified.

Consulting Category

The quantitative data showed that experts generally corrected more errors on any task or condition than did novices. The experts did best of all on consulting errors, feedback condition, standard task, where they corrected almost 90%. Therefore, one might suspect that the experts knew more rules than the novices, or perhaps that they could apply the rules they knew more successfully. The protocol data provide a more elaborate charaterization of the contrast between the experts' and novices' rule systems.

Experts did know more rules than novices. Although they mentioned rules for spelling and punctuation, predominantly they edited texts by consulting stylistic prescriptions, rarely distinguishing between what might be changed and what must be changed. Experts sometimes applied idiosyncratic rules. One subject, for example, justified shifting person from *one* to *you* because "*one* is like everybody in the world and *you* is like you're talking to someone about someone." In most cases experts appeared quite confident about their rule systems, applying them without hesitation, as in this example: "*Had gone*. I would question that. It's an imperfect repeated action, so would it take the, ah, a perfect verb? I don't think so. Use *went* or *gone*."

Novices knew fewer rules, and more of the ones they knew were erroneous and at times highly idiosyncratic. One subject put commas before every quotation mark as a matter of course; another refused to begin a sentence with *because*; another added *had* before all verbs which ended in *ed*. More rarely, novices were able to state rules correctly but weren't able to apply them. One novice listed four common tests to determine whether a sentence is complete, but when he applied the rules he had listed, he created a fragment. In general, novices appeared reluctant to apply sentence-level rules, preferring instead to talk about the literal meaning of the text.

Intuiting Category

The quantitative data showed that subjects corrected many more errors on the standard essays than on the self-written essays, with the exception of one error category, intuiting. On the standard essays, subjects corrected 49% of the intuiting errors, on the self-written essays, 47%. The data also show that, overall, subjects had a higher correction rate for intuiting errors than for consulting and comprehending errors. The protocol data offer two explanations for these findings.

In the following example, a novice attempts to correct a blurred pattern in one of the standard essays (*I think by breaking the stereotypical mold of the woman at home and in the kitchen demonstrates one way women can achieve equality*):

- That last sentence doesn't sound right for some reason. Uh--it's part of--*the woman at home and in the kitchen. Demonstrates one way women can achieve equality.* I think *one way which* might sound a little bit better. I think I would put, uh--I would change the whole sentence around, put, uh, *I think women can achieve equality by breaking the stereotypical mold of the woman at home and in the kitchen.*

The novice did not recognize that the sentence could be corrected simply by removing the *by*, as did many experts. But he was able to devise an acceptable correction, ostensibly by relying on native speaker insight as to the "sound" of English syntax. If the correction of intuiting errors draws on such insight, one would expect these errors to be easier to correct than consulting errors, where one must apply rules unique to written language, or comprehending errors, where one must attend to developing meaning. And this advantage would seem to apply, not only to standard texts, but to self-written essays as well.

DISCUSSION AND CONCLUSIONS

A major premise behind the present study was that editing for errors in writing is a process about which we have assumed a great deal, but that much of what we have assumed is unfounded. The results from the study confirm this premise in several ways.

A quite common assumption about the correction of sentence-level errors is that experienced writers have no trouble with the process. We have supposed that whatever errors experts make,

they make by accident--perhaps in the haste of recording an idea--and, more importantly, that they can correct these errors at will. We have supposed that experts draw quickly, even unconsciously, upon a well-defined set of rules, and that these rules are the same as the rules in handbooks of grammar and usage. We have taken for granted that, for experts, the act of editing a text for errors is an act of proofreading, where the nature of an error is apparent from a cursory visual inspection.

Yet, despite their demonstrated ability to produce error-free writing, the experts in the present study demonstrated some apparently un-expert-like behaviors. They did not correct *all* the errors in the tasks, even with feedback on error locus; they did not distinguish between matters of correctness and matters of style and taste and judgement; they did not operate entirely by a set of conventional rules for editing; and, most strikingly, they were no better, proportinally, than were the novices in correcting errors in their own writing.

It, of course, remains to be seen whether other, more experienced writers who demonstrate a similar mastery of sentence-level error will also demonstrate what we think of now as un-expert-like editing behaviors. My belief is that, to some extent, they will, with the exception perhaps of experts who are specially trained in language studies, like English teachers. We will, I think, find it common for experts to have internalized a set of editing rules that to some degree is idiosyncratic and unconventional, but it may be that the idiosyncracy of such rules is finally inconsequential if the rules provide the writer a needed schema for going about the evaluation of a text. We will also, I predict, find that other experts parallel novices in having great difficulty detecting errors in their own writing. If an error is a true error and not simply a slip-of-the-pen, then an expert will resemble a novice in detection rates.

More important than an exact replication of the present research, however, is the possibility that what we learn about the editing process from future studies will force us to enlarge our present notions of what it means to engage in error correction. If the findings here are borne out, then the process of editing for errors may come to be viewed, even for experts, not only an an automatic, mechanical activity which is highly circumscribed by convention, but as an activity which can share some of the uncertainties common in other writing tasks, such as editing for style. If the dominant metaphor for error correction now is mechanism, aiming to capture those aspects of the process which are simple and rote, perhaps an accompanying metaphor will emerge which conveys the senses in which error correction can be idiosyncratic or intuitive or, to use Bartholomae's (1980) characterization, an interpretive act.

Although the experts in the present study ressembled the novices in their low error detection rate for their own writing, they differed markedly in having a much lower rate of error commission. The experts simply made fewer errors to begin with than did the novices. This finding should not, however, be taken as evidence that novice editors can become expert editors only if they can manage not to make errors. Such a transformation would be very desirable, but much of what we know about language learning argues against its probability. Krashen (1981) has suggested that second language learners use what he calls "acquired" linguistic knowledge in ordinary unmonitored speech, but that they can apply consciously learned rules only when there is sufficient processing time to monitor their speech. Similarly, Labov has argued that "the most consistent and regular linguistic system of a speech community is that of the basic vernacular learned before puberty" (p. 35). Language forms learned after this period may never become second-nature. It may be that, in written language as well, linguistic habits that were not internalized in childhood will not become second-nature for the adult writer. A writer will not, except with great effort, inhibit such errors before making them.

The burden would appear to fall, then, on teaching writers to correct errors already made. Here the strategies used by experts can be helpful. One of the biggest differences between novices' and experts' responses to error occurred in the feedback condition, when subjects were given information on error location but not error type. In this situation, novices appeared to adopt a guessing strategy, with mistakes in spelling and commas being their high probables. If their first guess was wrong, they quickly guessed again, often without pausing to inspect the text. And though they generally claimed to understand any corrections that were pointed out to them, this understanding was sometimes not reflected in subsequent correction trials. The experts, on the other hand, approached the feedback condition in what could be called a "problem-solving" manner. Some studied the text for several moments, often experimenting on paper with different corrections. A wrong answer sent them back to the text for more experimentation and analysis. After recognizing an error, these subjects were frequently introspective about why they failed to detect it initially. In short, the experts were analytic in their attempts at error correction, and the novices were not.

One way to encourage such analytic behavior might be to adopt a variation of the experimental methodology used in this study. Writers could be asked to correct the errors they see in a text and to explain their corrections, and they could be given feedback on error location when they fail to detect an error. Although students often have difficulty verbalizing the reasons

for the changes they make, the requirement to do so would appear to force them to analyze their own rule systems. (See Whimbey and Lochhead, 1981, who argue that verbalizing problem solutions improves problem-solving skills.) And the repeated requirement to find an error where they thought there was none would seem finally to encourage them to bring to bear on the text the rule systems that are available to them. Thus, further research might show that this experimental paradigm, when used as a treatment over time, has value as an instructional tool. The higher correction rates of both groups during the feedback condition already indicate a positive effect short-term.

Whether future research on error describes or intervenes or treats, that research will need to consider the degree to which the typical methodology for studying error--the *ex post facto* analysis of errors in writers' texts--is a sufficient measure of editing performance. For a long time we have assumed that it is. Yet, in the present study, protocol data on writer's intentions and strategies made clear that textual analysis alone can be an insufficient and inaccurate measure. And although the present study confirmed the long-held assumption that editing someone else's writing is different from, and easier than, editing one's own, it also made apparent the usefulness of standard essays for purposes of research. Not only did writers make more corrections on the standard essay, they made more changes in style and word choice as well. All of these changes and corrections were accompanied by explanations, which resulted in richer protocols for the standard tasks. Thus, standard essays are excellent diagnostic tools for eliciting a writer's rule system for editing. It remains to be seen whether such essays could be useful pedagogically. If this were shown to be the case, a timely way to employ the essays would be by means of computers. It should be a relatively trivial programming problem to write an interactive editing system which would lead a student through a standard essay.

In any pedagogy devised to remediate sentence-level error, there is another variable to consider besides task, and that is the nature of sentence-level error. It has become standard practice to think of such error only in terms of the categories provided by handbooks of grammar and usage. Typically, we distinguish errors according to whether they are mistakes in punctuation or spelling or grammar or usage. Yet, such a classification may fail to capture the salient features of these errors, particularly from the perspective of the writer who must correct them. In the present research, such a taxonomy included ***consulting*** errors, mistakes which require writers to apply a rule; ***intuiting*** errors, mistakes which require a writer to "hear" something wrong; and ***comprehending*** errors, mistakes which require a writer to attend to

meaning. The quantitative results showed that subjects were able to correct more errors in some categories than in others, and the protocol data suggested that subjects used different strategies to correct errors from different categories--in both cases, evidence that the taxonomy has psychological validity.

The taxonomy should be refined and expanded. One might, for example, add a category for slips-of-the-pen--those accidental errors that writers can correct simply by "looking." And one might sub-divide the consulting category according to whether an error is contained within a constituent or is super-sentential, requiring an editor to read several sentences in order to recognize a discrepancy. When applied to error counts made at various grade levels, such a taxonomy could turn up interesting developmental trends in error commission and correction. There is also the possibility that it would be useful to teachers as a way of characterizing the activity of editing.

It has become a commonplace among composition specialists to decry the attention that teachers give to sentence-level error. The argument is made that students tend to neglect more substantive kinds of revision, what is called a re-seeing of ideas, in favor of simpler, less crucial matters of correctness (e.g., Sommers, 1978). There is a fear that students will, themselves, in attending to sentence-level matters, thwart their attempts to compose (e.g., Perl, 1979; for contrasting evidence, see Scardamalia, 1981) And there is evidence that teachers already respond to their students' writing most often by marking sentence-level errors as opposed to commenting on ideas (e.g., Applebee, 1981). Thus, it is a rare composition specialist indeed who now will not preface his remarks on sentence-level error with a disclaimer or apologia as to the relative unimportance of such a topic in comparison to other aspects of composition.

It could be, however, that we take the wrong tact in dismissing sentence-level error as inconsequential and then expecting it to be so by virtue of our proclamation. There is too much evidence that students at various grade levels aren't able to correct their texts and that their teachers aren't able to provide helpful instruction, despite good will on both sides. Whatever place error correction finally has in a writing curriculum, a pedagogy for error, like a pedgagogy for revision, deserves to be informed by research. The task of error correction simply is not likely to be made easier by the fact that we have decided that the task is unimportant, but rather by an increased understanding of the nature of error and the editing process.

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