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Abstract

Students are expected to come into the current college classroom already possessing certain skills including the ability to write at the appropriate academic level regardless of discipline and the ability to create well-structured arguments. Research indicates, however, that most students entering college are underprepared in both areas. One strategy that may help students write at a more academic level is teaching students to focus on spending their time on revision. In the current study, we examine two potential sources of difficulty in the revision of argumentative essays: a poorly developed argument schema and a poorly developed global revision task schema. We created and tested the effectiveness of two written tutorials designed to provide college students information to saturate their knowledge base as well as provide them with procedural tasks to complete. We found that without instruction, students focused their revisions on making local wording changes that did not qualitatively improve their essays. An argument tutorial helped students make higher level global changes, include more argument content, and improve the structure of the essay. A global revision tutorial also helped students make more substantive structural changes. Thus, both tutorials helped students improve their revisions, and the tutorials were completed independently by the students successfully.

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revision, argumentation, writing instruction, goals, global revision

The demands of the classroom and the workplace in the 21st century require students to become more proficient at writing. U.S. students, while having made modest gains, are still underprepared. The recent National Assessment of Educational Progress (NAEP) writing assessment of eighth-grade students found that only 2% wrote at an advanced level, 31% at a proficient level, 55% at a basic level, and 22% at a below basic level (NAEP, 2007). The results were slightly worse for 12th graders (1% advanced, 23% proficient, 58% basic, and 28% at a below basic level). One encouraging finding, however, was that routinely engaging in revision was associated with better performance. Students who stated that they were required to routinely revise scored highest ($M = 159$), followed by those who said they sometimes were asked to revise ($M = 140$), and finally by those never asked to revise ($M = 129$). Thus, it seems likely that giving students greater opportunity to revise will lead to improved writing skills.

Incorporating routine revision presents challenges, particularly for larger classes. Students usually do not spontaneously revise at an optimal level (Hayes, 1996; Hayes & Flower, 1986; Sommers, 1980; Wallace et al., 1996) and require explicit instruction. Indeed, Kieft, Rijlaarsdam, Galbraith, and van den Bergh (2007) found that instruction that focused on a revision strategy was most helpful for writers with an undeveloped writing strategy. While most teachers, especially those at the college level, are experts in their discipline, they are not typically experts at teaching writing and revision. Therefore, providing them with supplemental tutorials that could provide students with a better understanding of the goals and actions for effective revision could prove useful for improving writing in discipline-specific classes.

An additional challenge for teaching writing in discipline-specific classes is that written assignments frequently require persuasive style. The NAEP persuasive writing assessment (2007) found that only one quarter of 12th graders showed skill in developing a supported and convincing argument. Although some have argued that students do not need instruction that explicitly outlines the structure of each genre (Freedman, 1993), this is likely not true for the structure of an argument (Bromley, 2007). Although it may be the case that students do not require explicit instruction in narrative structure, students are less intuitively familiar with the structure of an argumentative essay. Students seem to learn quite young that an argument requires a claim supported by at least one reason (Coquin-Viennot & Coirier, 1992; Golder &

Coirier, 1994; Miller, 1986, 1987; Stein & Miller, 1993), but the majority do not acquire a more complete understanding of the components of written argumentative essays by 10th and 12th grade (Golder & Coirier, 1994; Knudson, 1992, 1994; NAEP, 2007) or even college (Wolfe, Britt, & Butler, 2009). Such genre differences may be due to differential exposure to argumentative texts, as compared with other genres (Freedman, 1993), and to the concomitant cognitive load required to consider qualifiers, warrants, and counterarguments to one's own position (Kuhn, 1991; Means & Voss, 1995; Perkins, Farady, & Bushey, 1991). Students who lack such exposure need explicit instruction in order to acquire a schema for argumentative texts. Indeed, Wolfe et al. (2009) found that a short tutorial that explained the basic structure of an argumentative essay was effective in helping college students write better argumentative essays.

In this article, we test whether both of these goals (improving writing through revision instruction and teaching basic argument structure) might be effectively combined. To what extent can college students' revision of argumentative essays be improved by providing a better understanding of the goals of revision (i.e., revision schema tutorial) and by providing a better understanding of the argument genre (i.e., argument schema tutorial).

Revision

Revision is a sequence of changes to any existing text at any point during the writing process (Fitzgerald, 1987; Flower, Hayes, Carey, Schriver, & Stratman, 1986; Hayes & Flower, 1986; Sommers, 1980). Hayes (1996; Hayes & Flower, 1980) proposed a model of writing and revision that focuses on the goal-driven, problem-solving processes. Revision, according to Hayes' model, consists of evaluating the text through reading, comprehending, and criticizing in order to detect problems with it and, when a problem is found, selecting and applying a strategy to deal with the problem. Depending on the nature of the problem, writers decide either to redraft or revise. In redrafting, a writer will modify both the plan for the text as well as the text itself. In simple revision, the writer will make only local modifications to the text (Flower et al., 1986; Hayes, 1996). Hayes describes the revision process as a special kind of reading activity, where the reviser is reading with the goal of error detection in mind, thus changing reading from a comprehension activity to a problem-solving activity focused on detecting, fixing, and improving. Problem solving is aided by special knowledge structures, known as *revision task schemas*, which can help students to detect problems in their draft and guide the selection of revision strategies.

Revision research has identified systematic differences in how skilled writers (i.e., expert) and less skilled writers (i.e., novices) revise their products. Experts revise more often than novices, who tend not to spend much time revising (Bridwell, 1980; Flower et al., 1986; Galbraith & Torrance, 2004; Hayes & Flower, 1986; Wallace & Hayes, 1991). As part of the process of composing, college freshmen devote less than 9% of that time in revision (Pianko, 1979). Experienced writers also revise recursively throughout composition rather than as a specific and isolated step (Flower et al., 1986; Sommers, 1980).

Researchers have found that expert and novice writers also differ in the type of revisions they make. For instance, Flower et al. (1986) found that only 12% of novices' changes influence meaning, compared with 24% of advanced students' changes and 35% of adult writers' changes. While both types of writers make local revisions, experts make many more global revisions (Hayes, 1996; Hayes & Flower, 1986; Sommers, 1980; Wallace et al., 1996). *Local revisions* are small changes, sometimes at, but mostly below, the sentence level. These include word and phrase choices as well as grammar, punctuation, spelling, and mechanical issues (Bridwell, 1980; Flower et al., 1986). *Global revisions* are larger changes made at the sentence, paragraph, and whole text levels. These changes are more semantic in nature and include deleting, adding, moving, or changing information across larger sections of the text (Bridwell, 1980).

Bridwell (1980) found that, for high school students writing to peers, most between-draft revisions were at the surface or word level rather than at a more global level of revision. In fact, only 11 % of their revisions were above the sentence level. An analysis of the quality of the final essays also revealed different revising patterns. Some students were able to successfully revise at multiple levels and improve the quality of their essays. The lower quality essays, however, had little revision between drafts or had only local-level revision (word and surface levels). Myhill and Jones (2007) found that even novice writers who acknowledge more sophisticated revision purposes often treat revision as a proofreading/minor editing activity with the goal of merely fixing the errors. This process contrasts greatly from experienced writers who think of the revision task as a time to reconsider the writing goal as a whole and the structure of the text at all levels (Bridwell, 1980; Hayes & Flower, 1986; McCutchen, Francis, & Kerr, 1997; Sommers, 1980; Wallace & Hayes, 1991).

The reduced focus on global revision may be, in part, due to having different goals for revising. Sommers (1980) conducted an in-depth case study of the revision strategies of student writers as compared with those of

experienced adult writers. She found that the student writers who focused their revision at the local level did not possess strategies for handling the whole essay, using mostly deletion. In contrast, the experienced writers, whose primary objective during revision was to shape their argument, employed a variety of revision techniques and took a more holistic approach to the revision process. MacArthur, Graham, and Harris (2004) suggest that students may lack knowledge that revision entails global changes and fail to set up appropriate subgoals for improving organization and coherence at the global level, or they may have a more limited definition of revision. They may also lack knowledge of standard text structures and, consequently, find themselves unable to establish the appropriate subgoals for effectively restructuring their text for a particular genre. In other words, they may lack an adequate task schema for revision.

Importance of a Task Schema During Revision

Instruction aimed at informing students about global and local revision should provide the appropriate goals, subgoals, and procedures for reaching those goals (Bridwell, 1980; Flower et al., 1986; Galbraith & Torrance, 2004; Sommers, 1980; Wallace et al., 1996). Researchers have found that providing students with task instructions that make the goal explicit improves revising (Graham, MacArthur, & Schwartz, 1995; Matsushashi & Gordon, 1985; Midgette, Haria, & MacArthur, 2008). Others that did not specifically examine the revision process have also found that task instructions (Ferretti, MacArthur, & Dowdy, 2000; Nussbaum & Kardash, 2005) and scaffolds (Nussbaum, 2002) improve single-draft products. These manipulations of task instructions, however, may be limited in terms of transfer or future application. Students may not see the instructions as generalizable to other writing situations or limited to the structure and content of the target genre. While these studies demonstrate that students who are given instructions can, on average, satisfy the specific task goal, with few exceptions, they do not attempt to provide a more general intervention that explicitly defines the goals of revision itself.

Wallace and colleagues, however, tested just such an intervention for improving global revision (Wallace et al., 1996; Wallace & Hayes, 1991). In a multisection experiment, Wallace et al. (1996) had college students write a letter of application for a summer job and revise it. On Day 1, the writing task was introduced and the students were given a homework assignment to prepare notes for writing their drafts. On Day 2, they wrote the first draft in class and rated the quality of that draft. On Day 3 (always after a weekend), the

experimental group was given an 8-minute revision prompt that discussed the difference between global and local revision. Then, all participants were given back a copy of their first draft and asked to make changes to it directly on their copies, which were later typed by another person. The researchers rated the quality of their revisions by measuring improvement of the whole text, change in self-perception, the scope/level of change, and the number of changes in each scope/level. They found that the revision prompt was significantly effective, both in overall improvement and in the number of changes at the global level for average-level writers (Experiment 1) but not for basic-level writers (Experiment 2). These results are encouraging that global revision can be significantly improved through explicit instruction that provides a task schema for revision.

Our present experiment extends this work by testing the effectiveness of a tutorial for teaching students a more complete revision schema to a more ubiquitous genre: writing argumentative essays (Chambliss, 1995; McCann, 1989). We created a paper-based revision tutorial and measured the impact of the tutorial on revisions, comparable with a class assignment that students might receive. We defined *global revision* as reflecting on and attempting to improve the focus of the text (e.g., thesis statement), the organization of presentation (e.g., paragraph development, section structure, order of presentation), and the coherence of the text as a whole.

In order to isolate students' skill in the cognitive processes involved in revision, we separated the drafting and revision phases of writing. This clear separation is artificial and atypical of many experts' writing processes (Flower et al., 1986; Sommers, 1980); however, it was necessary for experimental reasons. This separation might also have potential benefits during training, enabling students to focus explicitly on improving revision skill. For average writers, who may lose potential content or ideas if they concentrate on editing too soon (Glynn, Britton, Muth, & Dogan, 1982), separating drafting and revising may reduce their cognitive load. According to Glynn et al. (1982), requiring nonexpert writers to simultaneously attend to multiple goals is too demanding on limited resources. Instead, they argue that average writers will write better final products when they first focus on freely generating rich ideas and later focus on structuring (and restructuring). Thus, although done for experimental reasons, there is reason for us to expect that separating the initial drafting and revising periods might lead to more complete, but potentially less polished, initial drafts. Such a separation did not allow us to examine revisions occurring during initial draft writing, but it did allow us to examine the effects of our interventions on the revision process.

Writing Argumentative Essays

Students are expected upon entering college to possess the necessary skills to write well-structured persuasive arguments. The research conducted both in the past and more recently, however, has shown, overwhelmingly, that they do not (Knudson, 1992). The NAEP writing assessment found that students “have much more difficulty with persuasive writing tasks, which involve argument than with narrative, descriptive or expository tasks” (McCann, 1989). This assessment indicates that only a small percentage were rated “competent or better” on a persuasive topic (15.6% of 9-year-olds, 20.3% of 13-year-olds, and 15.2% of 17-year-olds, McCann, 1989). Part of this problem may be the emphasis placed on reading narrative texts rather than persuasive texts during formal education (Applebee, Langer, & Mullis, 1986). Nevertheless, persuasive writing is the most typical type of writing expected of college students regardless of academic discipline throughout their college careers and beyond. Kuhn and Udell (2003) claim that while good theoretical literature exists concerning argument, only a small amount of empirical evidence exists concerning the skills necessary to produce good arguments. As argument is the general academic writing style expected of university students, we used a prompt that required the students to produce an argumentative essay to examine global revision processes in this study.

Toulmin (1958) provided a framework for describing the structure of a basic argument. According to Toulmin’s framework, an argument consists of six features that are linguistically and semantically linked: claim, datum (referred to here as a *reason*, following Voss & Means, 1991), backing, warrant, qualifier, and counterargument. A *claim* is a debatable assertion presented to readers/auditors in order to persuade them. A *reason* is a statement used to support the claim, and a *warrant* is the underlying assumption that bridges the reason and the claim. Qualifiers and counterarguments determine the scope of the argument and set the conditions under which the claim is true or acceptable. We use the Toulmin framework not only because it is widely used to teach the components of an argument but also because it has been successfully used to score student arguments for experimental assessments of writing tutorials (Chambliss, 1995).

While the structure of an argument is rather simple, many students have difficulty writing complete and well-structured argumentative essays. In fact, recent research has pointed out several common problems in college students’ argument writing. Wolfe et al. (2009) had participants read 15 short arguments on a controversial proposal (whether we should ban cell

phone usage while driving) and then write an argument using their available notes. A detailed analysis of the student essays found that only 50% of the participants took a clear position on the assigned controversy. Thus, one serious problem with undergraduates' argument writing is not directly and precisely responding to the demands of the writing prompt. Wolfe et al. also found that while students provided several reasons to support their "claim," they often failed to provide backing or elaboration for these reasons. This lack of elaboration cannot be explained by a lack of topic knowledge because participants were given texts with elaborations, and the students actually included much of this backing information in the notes they took while reading the documents. This tendency to merely list unelaborated reasons is consistent with Knudson's (1992, 1994) findings with high school students. A final problem that researchers have noted is a tendency toward a "my-side" bias in which a writer focuses on reasons and evidence that support his or her own position to the exclusion of any other-side information. In fact, Wolfe and Britt (2008) found that, without instruction, only about half of their participants mentioned any opposing-side information. This finding is in line with other studies showing a similar bias among high school students (Knudson, 1992, 1994) and even college and graduate students (in an argument listing task; Perkins, 1985).

To some extent, each of these problems has a component that is due to simple lack of knowledge. Wolfe et al. (2009) found that a short tutorial, that simply defined terms and explained norms, was effective in reducing each of these problems. That tutorial was used in the present study and is described in greater detail below.

Importance of an Argument Schema During Revision

In order for students to revise an argument globally, they need to have a functional understanding of the structure of an argument, commonly referred to as an *argument schema*. Although students may receive more practice at writing argumentative essays in college, this practice alone does not always seem sufficient to improve their skills. Research also suggests that many students are not receiving enough instruction in their precollege education even though most educators claim that argument production is a skill that is necessary not only during college but also afterward (McCann, 1989). Chambliss (1995; Chambliss & Murphy, 2002) argues that students do not receive enough practice writing arguments, nor do the textbooks that they use contain arguments as a genre. As a result, students' lack of familiarity with the typical structure of an argumentative text and the effectiveness of

any general instruction regarding global revision will likely be hampered by their simply not knowing what to do at this level.

Wolfe et al. (2009) found that a tutorial aimed at providing college students with a better argument schema did, in fact, improve students' argumentative essays. Although this improvement was on initial drafts, we expected that this type of intervention might also help students revise their essays. We could not expect students to revise an argument well at any level if they did not know how to write an effective argument at all. Conversely, instruction on argument structure is also instruction on a genre-specific writing structure. Thus, we expected that teaching an argument schema would improve both the initial draft and the revision of the draft. This tutorial, used in the current study, is described below and presented in its entirety in Wolfe et al.

Present Study

While global revision has received some attention by researchers, the writing tasks and measures have not been optimal for better understanding the reasons that developing writers have difficulty writing the type of essays most characteristic of college assignments. For instance, prior research has focused on students revising experimenter-created materials or used writing assignments that are not essential for students to acquire for academic success (Adams, Simmons, Willis, & Pawling, 2010; Bridwell, 1980; Wallace et al., 1996). The current study examined global revision of students' own text, and the writing assignment was an argumentative essay that was to use content from multiple documents. We tested two potential sources of difficulty in revising such texts: lack of an adequate task schema and lack of a complete argument schema. In part, students may have difficulty revising argumentative essays because they do not understand how to globally revise. If so, a tutorial that defines global revision, explains why it is important, and presents information for creating task model subgoals should improve revision quality. Students may also have difficulty because they do not know the basic structure of an argumentative essay. In this case, a tutorial that explains the elements of an argument and why they are important should improve revision. It is also possible that students have difficulties for both reasons in which case any improvements should be additive.

The Revision Tutorial

To examine the extent of students' difficulty in revising stems from a poorly developed global revision schema, we created a paper-based global revision

tutorial, presented in the appendix. This tutorial explains the difference between local and global revisions but focuses on global revision. *Global revisions* are described as larger scale changes made at the sentence, paragraph, and whole text levels that make the text more semantically effective. Students are instructed to focus on deleting, adding, moving, or changing information as the major tools for global revision. Also, the tutorial has a section that explains the important components of a paper (thesis, paragraphs, beginnings and ends) followed by an explanation of global revision at the various levels (paragraph to whole, sentence to paragraph, the whole including organization, focus, coherence). Drawing students' attention to the elements that can be targeted for global revision should help them create subgoals to guide their own revision process.

Several aspects of the tutorial are expected to make it effective. First, processing limitations and working memory issues might explain why beginning writers focus only on local changes and expert writers can focus both on local as well as global issues (Bereiter, Burtis, & Scardamalia, 1988; Glynn et al., 1982; Hayes, 1996; Hayes & Flower, 1986; McCutchen, 1996; McCutchen, 2000; Piolat, Roussey, Olive, & Amada, 2004; Wallace et al., 1996). Expert writers may be better able to keep active the whole text structure such that the necessary changes are more accessible for them, whereas beginning writers may focus locally because they can only keep a small amount of text cognitively available (Butterfield, Hacker, & Albertson, 1996; Fitzgerald, 1987). To overcome these limitations, the revision tutorial presents its information as a series of short procedures that instruct students to examine and compare all the parts of the paper and determine the relationships of the smaller parts to the whole. After outlining their paper, for example, the students can then consider the relationship of each paragraph to the thesis and finally consider how each sentence is functioning in each paragraph. They have to be able to answer how that sentence is functioning, and if they are not able to come to a conclusion, then they have to make the decision to delete the sentence, add to the sentence, move the sentence, or replace the sentence. Second, the key procedures (deleting, adding, moving, or replacing) are also repeated several times in humorous, light language to increase their memorability and students' later access to these tools. Finally, each section of the tutorial presents what the student writer should do, why they should do it, what it means to do it, and what it means to not do it.

The Argument Tutorial

In prior work described above (Wolfe et al., 2009), we created an argumentative essay-writing tutorial to teach students about common student problems

in argumentative writing. As with the revision tutorial, each section of the argument tutorial covers what the skill is, how to do it, why to do it, and common problems in doing it. The argument tutorial focuses on the three areas of difficulty described earlier. First, the tutorial explains the importance of using precise language in stating the claim and highlights how simple wording changes can influence the types of reasons that can or cannot support acceptance of the claim. Second, the tutorial instructs students that each reason should be elaborated with examples, explanations, and evidence. Finally, the tutorial explains that not all readers will necessarily accept one's claim and reasons. Thus, the tutorial explains to students that counterarguments and rebuttals to those counterarguments should be included in an argument. As previously mentioned, this tutorial was shown to be effective in improving students' argumentative essays (Wolfe et al., 2009), and it was expected that it would also help in the revision process.

Half the participants in our study received each **[AQ: 1]**. To the extent that students' revision difficulty is a result of their lack of a clear understanding of what it means to globally revise and how to carry it out, we would expect the global revision tutorial to lead to improved revisions (i.e., number of changes, quality of changes, and location of changes) at the sentence level or above. To the extent that students' difficulty is due to a lack of an organization schema for this genre, we expected that the argument tutorial should help students to make more and higher quality changes, especially in terms of stating a precise claim supported by elaborated reasons that acknowledges the other side of the controversy.

Method

Participants

One hundred twelve native English-speaking introductory psychology students participated for course credit. There were approximately 28 participants for each between-subjects condition (see Table 1). Only those participants who completed each section were included in the analysis, forcing us to discard three of the participants' contributions. Most of the participants were freshman (77%) or sophomores (20%) and had not yet received any advanced writing instruction (66%). Further, 17% of the participants tested poorly on a required competency exam and were required to take a beginning English composition class below the average writing class at this university. Sixty-six percent tested into the average English composition class, and 18% tested into an English composition class above the average 1st-year course required for the general education requirements. Nearly

Table 1. Mean Number Location of Changes by Condition Overall

	Local	Global
Without argument tutorial		
Without revision tutorial ($n = 27$)	14.19 (7.86)	9.00 (6.19)
With revision tutorial ($n = 26$)	10.35 (9.99)	14.46 (8.50)
With argument tutorial		
Without revision tutorial ($n = 28$)	6.39 (10.38)	15.04 (8.52)
With revision tutorial ($n = 28$)	5.04 (6.33)	15.93 (10.03)

half of the participants (45%) revealed that they experience feelings of panic or frustration concerning writing.

Materials and Apparatus

The materials consisted of a background questionnaire, the revision tutorial, the argument tutorial, and a controversy. The selected controversy, banning cell phone use while driving, was a topic in which students were interested and of which they were knowledgeable. To ensure that students had quality support for their claim, several articles were provided, including two arguing for the ban, two arguing against the ban, and one that presented neutral, factual information.

Participants were given the choice of using either a computer or pen and paper to write their initial drafts and revisions. According to Hayes' model, features of the task environment will influence the writing process. For example, Gould and Grischkowsky (1984) found that proofreading and editing were about 25% faster when working from a hard copy. Although this difference in speed may not influence the quality of the revision, Hill, Wallace, and Haas (1991) found no differences between electronic and hard-copy medium in the number of text errors corrected or level (global vs. local) of these text corrections for either experts or novices. In an attempt to make sure that medium did not restrict the type of revisions participants detect or correct, participants in this experiment had both a hard copy and an electronic copy of their initial draft during the revision process.

Design

The design of this study was a 2 Global revision tutorial (present vs. absent) \times 2 Argument tutorial (present vs. absent) between-subjects design. The dependent measures were the number of changes, the location of changes

(e.g., word, sentence, text level) using the Bridwell (1980) coding scheme, and the quality of changes (ranging from -2 to 4) based on the Wallace et al. (1996) rating scale.

Procedure

The experimental sessions lasted approximately 2 hours. Upon arriving for the study, participants were randomly assigned to one of four conditions. During the first part of the session, the participants filled out a background questionnaire to assess the extent of their writing education and possibly gain insight into their skill level. Then, they read a set of articles about the controversy to ensure that they had some knowledge with which to create their essays. They were able to take notes during the study phase. When they were ready, they wrote a first draft of their argument and then took a break of approximately 15 to 20 minutes. During their break, we collected the first drafts and copied them before the participants returned for the second part of the session.

When arriving for the second part of the session, those participants who were assigned to receive one or both of the tutorials read them. Then, all participants were given back the articles, the tutorial(s), their notes, and their first drafts both on paper and opened in word processing software on the computer and were then given a chance to revise their essay.

Results

Location of Changes

The first draft was compared with the revision for each participant. The location of revision changes was coded using the Bridwell (1980) scheme. Local changes were any changes below the sentence level (e.g., changing, moving, deleting, or adding a single word or a phrase/clause) and changes in surface level (e.g., spelling and punctuation) that did not contribute to a significant change at the essay level. For instance, when a word was added that affected the cohesion of a paragraph, that change was coded as a global change, even though the item was at the word level. Global changes were changes at the sentence, paragraph, or text level. This included adding, moving, deleting one or more sentences, changes in purpose such as changing the essay from a narrative to an argument, adding a thesis, an introduction, or a conclusion, and developing the structure of paragraphs, especially in the essays that were originally one or two long paragraphs. Two raters scored each pair of essays, blind to condition, and disagreements were resolved through discussion. Interrater reliability was 94% agreement for the two raters.

A 2 global revision tutorial (present vs. absent) \times 2 argument tutorial (present vs. absent) \times 2 type of change (global vs. local change) mixed ANOVA was conducted on the number of changes between the first drafts to the revisions with the type of change was a within-subjects factor. The means and standard deviations are presented in Table 1. There was an overall main effect of Type of change, $F(1, 105) = 16.43$, $MSE = 70.62$, $p < .001$, in that there were more global changes ($M = 13.61$) than local changes ($M = 8.99$). There were significant interactions of Type of change \times Argument tutorial, $F(1, 105) = 20.46$, $MSE = 70.62$, $p < .001$, and Type of change \times Global revision tutorial, $F(1, 105) = 6.43$, $MSE = 70.62$, $p < .001$. A Bonferroni t test ($\alpha = .05$) indicated that without the argument tutorial, global changes were equally frequent as local changes (M difference = -0.54), but when the argument tutorial was present, the global changes were significantly greater than the local changes (M difference = 9.77). When the revision tutorial was not present, there was no difference in global and local changes (M difference = 1.73), but with the revision tutorial, participants made significantly more global changes (M difference = 7.50). No other results were significant. Thus, both tutorials helped students improve their revisions, and there was no cost or added benefit to having both tutorials at the same time.

Quality of Changes

While the location of changes provides interesting data regarding the tutorials' effectiveness, we also coded for the quality of the changes just to ensure that the changes the students were making based on the tutorials were actually helping them to improve the essays. We were worried that even though the students may be adding additional information and changing words, phrases, and clauses at the differing levels, they may be creating essays that were not better but just longer. The essays were coded for the quality of change from the first drafts to the revisions based on the improvement rating scale in Wallace et al. (1996). Scores range from -2 to 6 . The valance of the score indicated whether the change made the text worse (negative) or better (positive). The magnitude of the score indicated the degree of the change. A score of 0 indicated that the change did not affect the quality of the text. Larger score values can result from either a couple of major changes (whole sentence or multiple sentences level) or many small changes (usually at the word level or phrase level). Interrater scoring was completed by two independent raters and then the scores were compared. The raters agreed 91% of the time. As only one essay was scored as a negative change, negative changes were collapsed with no change. Also, the numerous categories for positively changed

Table 2. Number of Essays of Each Quality Type by Condition

Condition	Quality of change		
	No change	Minor change	Major change
Both tutorials	8	5	15
Argument tutorial	3	11	14
Revision tutorial	3	13	10
Neither tutorial	12	9	6

essays offered no more clarification separately than the collapsed version and so were categorized as either a minor change or a major change.

The number of essays of each quality type for each condition is shown in Table 2. A one-sample chi-square was conducted on the no-change data to test whether there was an effect of condition on whether positive quality changes were made. There was a significant effect, $\chi^2(3, N = 26) = 8.77$, $p < .05$. Most of the participants whose revisions did not improve the quality of their essay came from the no-tutorial group. An analysis of the minor changes and the major changes did not yield significant results. These results suggest that the tutorials did lead to overall improvement in the essays.

Content Versus Structure of the Changes

Because of the nature of the coding schemes, it appears, at first glance, that the changes made by the group who received only the argument tutorial were identical to the changes made by the group who received only the revision tutorial. Both groups made important and considerable improvements in their essays as far as the quality and location of change, especially at the global level; however, differences in the type of changes they made became apparent when we examined the revisions more closely. We had two independent raters score the between-draft changes on two dimensions: changes to the argument content and changes to the structure of the information. For each essay, we scored the number of changes to *argument content*, which could include taking a stance on claim, adding new reasons, elaborating on prior reasons, and presenting new or clarifying old counters or rebuttals. We also scored the number of changes to *global structure*, which could include adding an introductory paragraph, adding a concluding paragraph, presenting a thesis statement, clarifying or expanding on the thesis statement, and adding between-paragraph transitions. There was 92% agreement between the two raters for the scoring of the complete set of essays on the two categories of changes.

Table 3. Mean Number of Argument Content and Global Structure Changes by Condition Overall

	Argument content	Global structure
Without argument tutorial		
Without revision tutorial	0.78 (0.97)	0.89 (0.85)
With revision tutorial	1.00 (1.20)	1.77 (1.70)
With argument tutorial		
Without revision tutorial	2.23 (1.03)	1.88 (1.03)
With revision tutorial	1.61 (1.26)	1.96 (1.50)

The average number of argument-content and global-structure changes for each condition is shown in Table 3. A 2 Global revision tutorial (present vs. absent) \times 2 Argument tutorial (present vs. absent) between-subjects ANOVA was conducted on the number of argument-content changes between drafts. Participants receiving the argument tutorial made more changes to argument content ($M = 1.91$) than those not receiving the argument tutorial ($M = 0.89$), $F(1,103) = 22.47$, $MSE = 1.26$, $p < .001$. There was also a marginally significant interaction of Global revision tutorial \times Argument tutorial, $F(1,103) = 3.79$, $MSE = 1.26$, $p = .054$). As the condition with neither tutorial is the most interesting control condition, all other means were compared with this no-tutorial condition using a Dunnett's post hoc test. The only means that were significant from this control condition were from the group given the argument tutorial and the group given both tutorials. Thus, in order to improve students' revision of content in an argument essay, students need additional information about what an argument should include.

A 2 Global revision tutorial (present vs. absent) \times 2 Argument tutorial (present vs. absent) between-subjects ANOVA was conducted on the number of global structure changes between drafts. There was an overall main effect of argument tutorial, $F(1,103) = 5.45$, $MSE = 1.74$, $p < .05$), and a marginal effect of the global revision tutorial, $F(1,103) = 3.55$, $MSE = 1.74$, $p = .063$). Using a Dunnett's test, we found that all three means were significantly different from the no-tutorial condition. Therefore, both tutorials provided information useful for helping students provide more structure to their essays at a global level that improves the quality of the essays.

Discussion

These findings replicate those of other studies that have found a tendency toward local revision (Hayes, 1996; Hayes & Flower, 1986; Sommers, 1980;

Wallace et al., 1996). We found that students who did not receive a tutorial prior to revising made more local changes than global ones and produced a revision that was generally rated as not an improvement over the initial draft. For this level of student writing, it seems, global revisions are required to improve the perceived quality of the essay. Thus, the performance of students in the control condition generally bears out the observation that average college students need help to make meaningful changes when revising their argumentative essays.

In this study, we examined two potential sources of skill deficit: poorly developed argument schemas and poorly developed global revision task schemas. We tested whether students' lack of global revision was at least in part due to having an incomplete argument schema. We did this by giving half of our participants an argument tutorial that had been shown to be effective in helping college students write more complete argumentative essays (see Wolfe et al., 2009 for the actual tutorial). In the current study, we found that students who received this argument tutorial prior to revising made more global changes than local changes, made more argument-content changes (e.g., they elaborated or added reasons, added counter or rebuttal information), and even made more global structure changes (e.g., adding introductory and conclusion paragraphs or added transition between paragraphs).

These results are consistent with Midgette et al.'s (2008) finding with very young students writing argumentative essays. They gave fifth and eighth graders different goal instructions after writing a first draft on a controversy. They found that the final drafts of those told to consider the audience as a goal wrote final essays that did in fact consider other-side information. Thus, helping students better understand the goals of an argumentative essay does help them satisfy those goals.

In the current study, we needed to present the argument tutorial after the initial drafts because we wanted to detect whether this type of genre knowledge was partially responsible for minimal global revisions. Based on Wolfe et al. (2009), we expected that giving the argument tutorial earlier would have also led to differences in the quality of initial drafts, thereby making it impossible to detect differences due to the revision tutorial. In a real teaching situation, however, it may be best to present the argument tutorial prior to writing the initial draft so students would write a more content-complete initial draft. If this tutorial is used to help students learn what content is needed, it should not lead to the aforementioned cognitive overload situation. Revisiting the argument tutorial during revision could then help students focus on the structure of information.

In this study, we examined whether a poorly developed global revision task schema may also be the reason for low-quality, local revisions. This

problem was tested by giving half of the participants a global revision tutorial to help them create an appropriate task schema. We found that students who received this tutorial made more global changes than local changes, and these changes had the effect of improving the global structure of the essay. These results are consistent with Wallace et al.'s (1996) findings that a short tutorial can help students learn to revise. The current research, however, extends Wallace's findings to a writing task that is central to academic situations.

Our global revision tutorial included both an explanation of the types of revision and the structure on which to target global revisions as well as provided tasks to perform on their own work. We believe that students need to have the goal of global revision, and they need to understand the textual elements that can be the target of global revision. If students are not aware of the elements of a paper and their intended function, then the definition of global revision will not be very helpful. Future research could more carefully separate these elements, but it may not be interesting or important to do so.

The results suggest that both lack of knowledge about the structure of arguments and the goals of global revision contribute to the difficulty that average college students have with revising argumentative essays. Each tutorial was individually effective for improving the quality of student essays. We did not, however, find an additive effect of the two tutorials in which the combined tutorials lead to a significant improvement over having just one of the tutorials. In part, this was because the argument tutorial was sufficient to induce a fair amount of nonargument-related global revision. Another factor may have been due to presenting both tutorials in the same session. Students may have had difficulty assimilating all of the information in both tutorials and simply ignored some amount of the training. If this is true, giving students time to study and assimilate the tutors in separate sessions might produce additional benefits. Of greater interest is longevity and generalizability of the tutorial exposure. We expect that practicing several sessions with each tutorial might be necessary to have students actually be able to use this information outside of the experiment context and without the tutorial present.

Our tutorial interventions are consistent with two of Graham and Perin's (2007) suggestions for improving adolescent writing. Their first suggestion is to teach specific strategies that will help students in planning and revising their papers. This suggestion is accomplished in each of the tutorials by presenting procedures with specific steps to follow. The second suggestion is to set goals and expectations for the product. As this intervention is targeted at late adolescents, we created tutorials that would help students to internalize features of a "well-structured" argumentative essay as well as more general elements that readers expect to see in any essay.

The current study has limits that future research should address. One limit is that the participants were not learning this material as part of a class. While we were encouraged that we achieved such strong results when there was no grade depending on whether the students learned the material or not, implementing these tutorials in a classroom situation would be necessary to examine their practical effectiveness on student writing abilities in a more natural learning environment. When writing for a class, students may revise more iteratively, and the effects of these tutorials could be tested in a less stage-like revision situation. Finally, testing the effectiveness of these tutorials in a class situation would allow one to include the opportunity for students to receive feedback along with the tutorials, potentially making them even more effective.

A second limit is that the majority of the participants were average-level writers. We cannot address the potential beneficial effects for students at different skill levels. The tutorials need to be tested in a variety of groups with varying writing skill levels. They might be effective even at the high school level so that the students coming into college will be better prepared for the writing tasks that are ahead of them. Furthermore, when students enter college at a writing level that lags behind their peers, they might be helped by having tutorials, such as these, that they can work through independently in order to achieve the skill level that is expected of them.

Although we are encouraged by this short revision tutorial, an additional limit is the prospective long-term effect on subsequent revisions and in changing students' understanding of the goals of revision. We do not expect that a single-shot intervention will fundamentally change students' task schema. Based on the Myhill and Jones' (2007) results, students do, in fact, have some understanding of global revision. However, as noted by Jones (2008), students' view of revision is affected by the type of feedback they receive. A long history of being corrected for grammatical and local errors may lead to an enduring understanding of the importance of local revision that may be difficult to change. Perhaps less expert writers have to fix local errors before teachers or peers can help them reflect on the global structure of the essay. Students who revise locally likely make many surface-level mistakes, and they have likely had a history of receiving feedback and suggestion to make that level of changes. Therefore, it is important to better understand the extent to which these findings will generalize to other revision situations and effect deeper conceptual or dispositional approaches to revision.

The current results showing the effectiveness of these two tutorials in improving revision performance is encouraging. Such tutorials can be used as a supplement to large classes in different disciplines. They could also be used

by students, themselves, to aid their own writing. We do not propose that such tutorials are a panacea for all of the problems of student writing or even those of revision. Their purpose is to produce an improvement by addressing a simple lack of knowledge. Toward this end, it was heartening to find that several students in the study were asked to take the tutorial with them after the end of the study.

Appendix

Revision Tutorial

A Piece of Writing Is Believed to Be a Reflection of the Mind of Its Writer. Revision is often ignored as part of the writing process for many student writers mostly because we do not leave ourselves enough time to both write and revise well. However, research clearly shows that one of the main differences between lower level writers and higher level writers is that higher level writers not only spend more time in revision but also revise differently. The problem is that no one directly tells beginning writers that they are/are not doing this or how to change it, so they have to discover it in much more stressful ways, usually involving lower grades on their papers and not understanding why—a very frustrating learning experience. This short tutorial will show you how to revise effectively to make your writing process much easier and boost your skill level enormously. First, you will read about the typical parts of any paper, two types of revision, then how to make effective revisions.

Parts of a Paper

Thesis. The thesis of the paper is the guiding plan of your paper, and it will probably change throughout the writing process—let it. Do not become so stuck with the thesis that you produce an inferior argument simply because you feel that you have to stick with the original thesis. At minimum, the thesis contains the main topic of the paper and the stance that the paper will take. At best, it also contains the reasons that the paper will present to support that stance.

Example:

Topic: Beagles as pets

Stance: positive

Reasons: physical features, pack dogs, friendly dispositions

Thesis: Beagles are good dogs for families because they are small and clean, they are pack dogs, and they have friendly dispositions.

If you break down the thesis process into steps, then the paper has somewhere to go both for you and for the reader so that neither of you is lost, and your writing process merely becomes filling in the slots you have just opened up with your thesis statement.

Paragraphs. The paragraphs contain the information that explains as well as provides examples and support for the thesis. You must be able to relate each paragraph back to the thesis. In the thesis, you have promised to present certain ideas; in the paragraphs, you do it. They are usually between 3- and 7-sentence long with an introductory sentence with the main idea, a bunch of explanatory sentences in the middle with specific and interesting details, and a transition sentence at the end that moves the reader's thinking from the current information to the next idea. The most important idea here is that each paragraph should develop only ONE idea. Writing in just a few big paragraphs taxes the readers too much for them to pay attention to your ideas, so they start paying attention to those darn spelling errors ;).

Beginnings and ends. All papers in every genre and discipline have beginnings and ends. These are more flexible and generally stylized to the genre that you are writing in. The beginnings let the reader know what is coming and the end usually explains why what came before should be important to the reader.

Revision

Global versus local revision. *Local revision* refers to making changes at the word/phrase level, generally correcting grammar, spelling, word choices, and punctuation. This type of revision is where most teachers and lower level writers focus. While this revision is important, it does not really change the quality of the writing or improve the skill level as much as revision at the global level. In fact, if you write a skilled, engaging paper, then readers/graders will not notice some of the smaller errors as often as they will when the paper is from an unskilled writer. Most people have a sense of what global revision is, but they cannot explain it or do it effectively because, frankly, even teachers have a hard time explaining it. *Global revision* refers to making changes at a comprehensive level including the content and organization of the piece so that the writing engages the readers rather than frustrates them.

Revising at the global level. Although everyone's writing process differs a bit, one of the easiest (and fastest) ways to move through the writing process after the research is done, of course, is to develop the thesis statement, then write the first draft quickly and at a very simple level as though explaining the concepts to a child. This technique ensures that the ideas are presented clearly and relieves the pressure to sound smart. After writing the first draft, allow some significant time away from the paper, then outline it and get ready

for revision. In global revision, you will examine if each paragraph relates to the whole, if each sentence in the paragraph adds to that paragraph, and, finally, if the finished product is focused, coherent, and organized.

Paragraph to whole

Delete Replace Move Add

Consider each paragraph on the outline and explain to yourself how it relates to the thesis you have developed. Does it explain, support, or provide examples? If it does not, make a decision to delete it, replace it, move it, or add to it. As many people find writing so difficult and/or frustrating, they fervently avoid deleting a piece of writing that took so long to produce. However, when passages are left in that do not relate, the reader is taken in too many different directions, and the writing seems uncontrolled and chaotic.

Sentence to paragraph

Delete Replace Move Add

After examining each paragraph, look at each sentence in that paragraph and make sure that it is functioning in some sort of way rather than merely adding fluff to your writing. This fluff technique is immediately apparent to readers/graders and puts them on alert to understand why you feel you need to be fluffing. Also, vary your sentence length so that the reader does not become fatigued either from reading a series of long sentences or from reading strung-together short ones which becomes tedious. Each sentence should be introducing, illustrating/explaining/giving examples, or transitioning to the next idea. If it is not, delete it, replace it, move it, or add to it.

The whole. Following your examination of the paragraphs and the sentences within the paragraphs, pull back and read the text as a whole, concentrating on making certain that it is organized, focused, and coherent.

Organization. Organization refers to the order of the information. Ask yourself if the order with which you have presented your material is logical with a clear flow. One option is moving from general to specific information or the other way around and starting with specific information and moving to general observations. You could also present the problem, then the solution. In argument, it is generally better to present your best reason/support last as this is what stays with the reader.

Focus. As a credible writer, you want to give the impression that you have control of your writing and, thus, your ideas; otherwise, you have sent the

reader to a frustrating and chaotic place. Each aspect of the text should be related to the central message in a concrete way. Make sure you have been clear so they do not have to guess or make their own assumptions about why you have included certain information or have chosen to leave out other information.

Coherence. Coherence refers to making sure that all parts of the text connect clearly to one another including sentence to paragraph and paragraph to whole text. Creating coherent text guides the readers to make the links that you want them to make. When a piece is not coherent at any level, the readers stop listening to your message and start paying attention to the fact that the text is not coherent.

Last step. Go back and revise locally checking your grammar, punctuation, and word-level choices. Finally, make sure you do not lose your own writing voice, and have fun expressing your opinion intelligently as a higher level writer.

Quick and Dirty Global Revision

Develop a solid thesis with a main idea, clear stance, and strong supporting reasons.

Make sure each paragraph relates to this fabulous thesis.

Make sure each sentence in each paragraph is functioning in the paragraph rather than fluffing it.

Make sure the whole text is logically organized, concretely focused, and clearly coherent.

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