Revising with Metacognition to Promote Writing Achievement: A Case Study

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Abstract: This study examined the relationship between metacognitive revision and writing achievement in one instructor's developmental writing courses. Since American students often have had little strategic writing instruction in high school, they frequently come to college as non-proficient writers. By focusing on self-improvement rather than agonizing over the quality of the final product, struggling writers' fears and lack of confidence can be mitigated, allowing growth. Requiring students to revise their essays and explain these revisions may influence the likelihood of completing the stages of the writing process, including using feedback. Results indicated that students who received high scores in revision explanations often received higher scores on the final essays than their peers. Additionally, from the pre- to post-intervention attitudinal survey, student responses showed more positive feelings about writing, increased confidence in ability and self-efficacy, and greater interest in providing feedback to classmates. Despite these gains, fewer students at the end of the semester felt that feedback, revision and reflection affected their writing performance, suggesting feelings of frustration at the multi-faceted process.

Keywords: metacognition, revision, feedback, writing process, writing achievement

Students know that they *should* revise their writing, but they often stick to surface-level changes, failing to take advantage of feedback from their peers and instructor. With a staggering percentage of students arriving at college lacking proficient writing skills, there is an increased need for instructors of composition to work with students on improving their writing achievement. In 2011, the last year for which NAEP released writing assessment data, only 24% of twelfth grade students were rated as proficient writers, while 73% scored at basic or below basic levels; 3% performed at advanced levels (National Center for Education Statistics, 2012). Although NAEP also tested writing in 2017, "preliminary analyses" of the student data "revealed potentially confounding factors in measuring performance," requiring further scrutiny before a report is released in 2020 (National Center for Education Statistics, 2019, para. 2). With scores for twelfth graders making slight rises and falls over the most recent iterations of the test (Salahu-Din, Persky, & Miller, 2008), it is unlikely that today's students have sufficiently made the advancements necessary to achieve proficiency.

Revision has long been a requirement of college composition, but students are often not instructed sufficiently in how to revise, nor are they held accountable for their revisions. Instructors fret over the lack of alteration that occurs from rough to final draft, especially when they have engaged with the students in offering written and/or oral feedback, yet students often fail to implement changes due to their own feelings of frustration or being overwhelmed (Lee, 2011). Even when they acknowledge their deficiencies in writing and state that they want to improve, students often do not follow through with revision (Achen, 2018).

Many variables affect why students may or may not revise their writing. Patchan, Schunn, and Correnti (2016) studied students' rates of making changes as well as the quality of those revisions following feedback, and they discovered that the probability of whether or not students would revise was affected by the type of feedback given. When students received praise or localized feedback, they

were more likely to revise, but several other types of feedback and excessive feedback often resulted in few revisions (Patchan et al., 2016). Writers' ability levels can also affect revision likelihood, as students may not possess the requisite tools. Strong writers may automatically apply metacognitive strategies to their writing process, but non-proficient writers often lack these skills (Berninger & Swanson, 1994).

These studies suggest that educators' best efforts at helping students improve their writing are often ignored, requiring a need for an alternative approach, one where students are tasked to think critically about their revision process in response to well-crafted feedback. Thus, in order to increase confidence in writing and advance writing achievement while decreasing the fear of failure, the present study implemented a metacognitive revision framework where students were required to articulate their metacognitive strategies as they revised their writing.

Review of the Literature

Metacognition and Learning

Requiring students to think about their thinking has shown positive effects in numerous studies in secondary and higher education (Colthorpe, Sharifirad, Ainscough, Anderson, & Zimbardi, 2018; Wade-Jaimes, Demir, & Qureshi, 2018; Hargrove & Nietfeld, 2015). López-Vargas, Ibáñez-Ibáñez, and Racines-Prada (2017) studied how metacognitive scaffolding increases learning achievement by reducing the cognitive load, freeing up mental resources. Two sets of eleventh grade students competed computer-based learning modules as part of a philosophy course; one group had access to metacognitive scaffolding, which included pop-up windows to assist in checking prior knowledge and setting goals, while the other served as the control. At the conclusion of each module, students were tested on the content. Students who had access to the metacognitive scaffolding achieved significantly higher results on the test.

In a similar study of ninth grade history students, Smith, Rook, and Smith (2007) tracked the achievement of three groups: a control group who did not participate in a journaling exercise, a group who responded to text-related journal questions, and a group who were given metacognitive journal questions in addition to the text-related ones. Based on grades at the end of the course, the students in the first two groups showed similar results, suggesting that the text-related journaling, which focused only on cognition, did little to advance the students' skills. However, the students who received the metacognitive questions in addition to the text-related ones significantly outperformed both groups, demonstrating the usefulness of the approach for raising achievement.

Furthermore, metacognition helps students build skills that can transfer to other learning contexts, therefore assisting future learning tasks. Scharff et al. (2017) studied metacognition's role in learning transfer and found a positive correlation after examining survey data from both students and staff. While staff usually felt that they assisted students with learning transfer, students largely reported difficulties with this skill. Students noted that, when they think about their learning processes, they are more likely to apply strategies. Thus, the researchers recommend that faculty are more explicit in communication with students in how to transfer skills from one context to another; they should make stronger connections by providing practice opportunities and delivering feedback. Similarly, in a study by Redwine, Legette, and Prather (2017), agricultural communication students were tasked with "reflect[ing] on their metacognitive awareness" throughout their semester (p. 56). The researchers found that, as students became more aware of their own metacognition and areas of weakness over time, they became more focused on "adjust[ing} their strategies as necessary to achieve their goals on the next assignment" (p. 64).

Metacognition's Importance in Writing Instruction

When students think critically about their writing processes, they can increase their understanding while reducing negative feelings associated with writing (Santelmann, Stevens, & Martin, 2018; Pacello, 2014; Teng & Zhang, 2018). Pacello (2019) argued that developmental writing programs need to abandon traditional remedial approaches, such as teaching grammatical skills in isolation, and adopt a "process-oriented mindset" (p. 188). To help students improve their metacognitive skills, which would assist in developing "abilit[ies] to monitor" and "reflect on and evaluate [their] learning," Pacello included reflective tasks in his instructional design (p. 189). Students reported on their own understanding of their evolving writing skills throughout the semester in blogs. Through a qualitative review of the data, Pacello confirmed that his students understood the importance of the steps of the writing process as a way to improve their writing. Furthermore, in their 2015 study, Stewart, Seifert, and Rolheiser asked students to rate their feelings about various writing tasks. The researchers found that students who used metacognitive strategies self-reported reduced anxiety and increased self-efficacy regarding writing.

Though the previous studies focused more on improving attitudes rather than writing achievement, this is a natural byproduct of a metacognitive focus. Yu (2013) examined the correlation between metacognitive ability and writing achievement by surveying students classified as "successful" and "at-risk" based on the results of a literacy test. Unsurprisingly, when surveyed about the metacognitive writing strategies they utilized, such as skimming text, organizing, and planning, the at-risk students often misunderstood, could not define, or stated that they did not utilize those strategies. In particular, they self-reported making revisions with less frequency than the successful students. The researcher concluded that struggling students need guidance throughout the writing process to encourage their usage of metacognitive writing skills, which both "positively transfer to writing performance" and help them become "autonomous learner[s]" (Yu, 2013, p. 42).

Furthermore, students who are tasked with practicing their metacognitive skills can learn how to enhance them, leading to increased writing achievement and independence. For example, when Ramadhanti, Ghazali, Hasanah, and Harsiati (2019) surveyed students at an Indonesian university with a Metacognitive Awareness Inventory, they uncovered weaknesses that affected performance. The researchers assert that increased awareness of "thinking processes while learning" will result in students' ability to regulate "their goals, dispositions, interests, and attention in learning" (p. 51). The researchers recommend that educators train their students with explicit strategies in self-monitoring and evaluation to become more autonomous as learners and writers.

The Significance of Meaningful Feedback on Writing

Countless studies have demonstrated the critical nature of feedback to improving student writing. In a study to measure effects of feedback in developmental writing classes, Gulley (2012) describes how rough, pre-feedback drafts and revised, post-feedback drafts were rated by evaluators. Across all groups, students made significant improvements to their essays after receiving instructor feedback.

The value of feedback depends, in part, on its quality. Feedback is most effective when it focuses on content and suggests areas for improvement rather than just editing or making superficial comments (Beach & Friedrich, 2006). Sommers (1982) notes that additional confusion may ensue when students read instructor feedback that misinterprets their purpose for writing the paper, resulting in changes that are based on what the student *perceives* their teacher wants, rather than what they had actually intended as the writer. This is especially the case when instructors focus on marking up grammatical issues, "giv[ing] the student an impression of the importance of these errors that is all out of proportion to how they should view these errors at this point in the process" (p. 150). Patthey-

Chavez, Matsumura, and Valdés discovered a similar phenomenon in their 2004 study. In an examination of multiple student drafts to assess feedback-based improvement, the researchers reported that those who received feedback on substantial issues improved their essays more so than the students who received only corrections.

The way in which feedback is framed also affects students' efforts in revision. Torres and Ferry (2019) discuss the roles of power and identity in relation to feedback. In their case study, they describe the results of a student who received empathic feedback that pushed self-reflection rather than correction. When she felt seen and valued, her resentful attitude toward the writing process shifted, and she began addressing the feedback rather than resisting it. In the same vein, Abdel Latif (2019) describes feedback as needing to be "managed with care" due to its potential to influence student affect toward writing (p. 158). Though his study involves L2 (second language) learners, many similar characteristics are shared with students in developmental writing classes: students often possess feelings of anxiety, lack of motivation, and poor self-efficacy due to past negative writing experiences. The researcher offers detailed guidelines on "optimizing teacher feedback" and "orchestrating peer assessment activities" to help educators mitigate criticism and properly train peers to respond meaningfully to one another's writing (Abdel Latif, 2019, pp. 158-159).

Supporting Students' Efforts in Revision

Struggling college writers necessitate strategic and affective support to gain confidence and improve their skills. Zhang, Schunn, and Baikadi (2017) examined how variables (peer review comments, self-reflection, and writing goals) influence students' efforts and quality of revision on their writing. They found that students were most likely to make high-level revisions to their writing when utilizing all three variables. With the support framework in place, only 28% of the students' submitted revisions were spelling or grammatical errors; the rest were higher-level revisions.

In order to create worthwhile revisions, writers need to be taught how to find issues in their writing, how to address them, and how to look for additional areas to revise. In his examination of the history of revision research, Hayes (2004) detailed limitations in early models, such as too much emphasis on "text faults" and not enough on the reflective elements of revision (p. 9). Hayes preferred newer models that included metacognitive processes such as "task definition, evaluation, and strategy selection" (p. 12), noting that revision involves more than addressing errors; it also must involve setting goals and finding "opportunities" (p. 13). He proposed a "detection-first position" (p. 15), meaning that writers must be able to perceive problems in their writing before they can correct them, even if they do not have the knowledge or ability to fix the issue. Hayes argued that "teaching students to understand and apply criteria of text quality" would improve both their revision efforts and subsequent drafts (p. 20).

Support is necessary for struggling writers in all aspects of the writing process, including peer review, to create significant changes. Instructional approaches should include training to help students focus their feedback on critical areas of development. In their 2016 study, Singh and Hoon examined the types of revisions that students made in their essays following peer feedback. Students were trained to utilize a narrative marking guide to help them identify issues in their partners' essays. While they self-reported positive feelings about giving and receiving feedback, much of the feedback led to local (defined here as smaller, often surface-level changes affecting only one or two sentences, such as altering vocabulary or fixing grammatical errors) rather than global (deeper changes "affect[ing] clarity, text organization, and purpose") revisions (p. 130). Though many students corrected mechanical errors, the researchers concluded that students required additional training to provide adequate feedback suggesting global revisions.

The present study builds upon the discussed research by encouraging students to utilize their own metacognitive strategies as well as teacher and peer feedback as sources for revision. By grading students' early-to-mid semester essays based on their process rather than just the quality of their work, students may focus more on self-improvement. Students' use of metacognition as they revise their writing may help them create more significant, high-level revisions that lead to increased writing achievement.

The study addressed the following research questions:

1. How does requiring metacognitive revision influence students' writing efforts and achievement over the course of the semester?
2. Does the type of revision (global versus local) affect writing achievement?
3. What are students' perceptions of the influence of the writing process on their writing?

Method

Participants

The study's sample was composed of 94 college students at an American public university who, based on their high school grade point average of below 87%, needed to take a prerequisite writing course before foundational English composition. Almost all students were in their freshman year of college, but a few were in their second year. Students were undeclared or from a variety of majors. The sample included many students enrolled in one of two equal opportunity programs at the university, meaning that they come from groups traditionally underrepresented in higher education: low-income families, educationally disadvantaged, first-generation college students, and/or minority backgrounds. Largely identified as underprepared, many students in the opportunity programs struggle with retention based on institutional data.

Before they began the writing intervention, students were rather similar academically, despite their varied background characteristics. The student sample had a mean verbal SAT score of 506, and the mean high school GPA was 82%. Most students' SAT scores were within 51 points of the average, and most GPAs were within 2.84 percent of the average.

As the researcher and the only instructor of the metacognitive revision teaching strategy, due to limited resources, I employed the convenience sampling method and used students in my own four classes in the sample. This dual role required me to ensure that I followed ethical guidelines. To guard against coercion, I completed, submitted, and received approval to conduct the study via the Institutional Review Board. An undergraduate student tutor in each class explained the study and passed out consent forms, which were placed in sealed envelopes I did not open until after the semester when grades had already been posted. Students received no incentives for their consent; their grades were completely unaffected, and there was no chance I would treat students differently since I did not know who consented until after the semester concluded. While the de-identified baseline essay, revision, and final essay scores of all students who completed the intervention were included in the study, students were informed that writing samples would only be included if they gave consent. Students' survey responses were also anonymous. Furthermore, it should be noted that, in an effort to avoid placing undue emphasis on my personal research agenda, I limited the weight of the metacognitive revision explanations to less than 25% of the grade on each of the earlier papers.

Instruments

I developed a two-point rubric (see Table 4 under "Results and Discussion") to score the quality of each revision on each early-semester essay. Also, I created genre-specific rubrics to score the baseline essay as well as the two late-semester essays. Finally, I developed a thirteen-question writing survey (see Table 5 under "Results and Discussion") with a five-point Likert scale ranging from 1 "strongly disagree" to 5 "strongly agree" to measure attitudes about writing, revision, and feedback.

Procedures

As part of their grade on seven early-to-mid semester essays, students were assigned to not only revise rough drafts but to explain each of the revisions they had made. They were required to articulate what they changed, why they changed it, and how the new way was better/clearer for the reader. It should be noted that a number of revision explanations varied for different assignments; requirements ranged from four to six. Students were not assigned to explain revisions on the two late-semester essays.

During the first and last weeks of the semester, students were sent an e-mail with a link to the Qualtrics survey through the university's learning management software. They completed this on their own time.

The instructional intervention included multiple components and supports for student success. Students practiced writing in several different writing genres: persuasive, argumentative, narrative, descriptive, compare/contrast, and research. For each unit, students developed background knowledge, discussed genre characteristics, read model essays and/or watched/listened as I modeled writing, learned writing strategies, practiced writing tasks with scaffolded support, and wrote independently. Additionally, students were given opportunities for choice, feedback, reflection, revision, sharing, and tutoring as part of this self-regulated strategy development (SRSD) model.

The peer review process was a critical aspect of the intervention, as this was a chance for students to receive ideas on what should be revised in their papers. Since their grades on the seven early essays were heavily influenced by their efforts in making and explaining the revisions, and since they received scores for the evidence of the process itself, most students took peer review seriously. For each essay, students exchanged rough drafts with partners, notated suggestions for improvement, and filled out a feedback form tailored to the specific criteria of the genre. To train students as strong peer reviewers, instructional scaffolding included multiple large and small group evaluations and discussions of sample text as well as detailed explanations of how to use each feedback form.

Data Collection and Analysis

A mixed-methods approach was used to analyze data. For the first research question, each revision explanation (from the seven early-to-mid semester essays) was scored for quality with the two-point rubric. That is, regardless of the quality or type of the revision itself, the student received a score for how well they articulated what they changed, why they changed it, and how it was better/clearer for the reader. The two late-semester essays were scored for actual quality with a rubric specific to the requirements of the writing genre; students did not explain revisions for the last two essays but were still encouraged to revise based on peer review and self-monitoring. While students did not receive grades for quality on the baseline essay, receiving points for effort, instead, it should be noted that these essays *were* scored for quality for the purpose of this study. Student progress was tracked from the baseline to the final essays.

For the second research question, students' revision explanations were coded for type (global or local). Global revisions were those that focused on deeper issues such as development and

organization, whereas local revisions focused on issues such as word choice or sentence fluency. While students were encouraged to edit for grammar and punctuation, these did not count in this study as revisions, unlike in the study by Singh and Hoon (2016); however, since many students still submitted explanations of these changes, they were coded separately as edits. Students were allowed to provide more than the required number of revisions to gain up to and including a perfect score, resulting in some students having a large number of codes per essay. Only scored revisions received a code; extra revisions did not. Regression analysis was used to examine the correlation between revision efforts across drafts and overall writing achievement.

For the third research question, I compared pre- and post-intervention responses obtained from the Likert scale questions on the survey to understand participants' perceptions over time of how completing the steps of the writing process can influence their writing.

Results and Discussion

Correlation between Revision Achievement and Final Essay Achievement

Data was collected from only 65 of the 94 students; although the full sample of 94 students completed revisions on the earlier essays and submitted the late-semester essays graded for quality, I failed to record the scores of the final essay for one full section of students, reducing the number of the sample. I recorded grades into the learning management system as a part of their coursework, but those scores included additional components, such as a rough draft and peer review paper, which did not affect the essay's actual quality and would have skewed results positively or negatively. Therefore, the fourth class did not have scores for their final essay and were excluded from the analysis. Additionally, three students did not submit one of the essays scored for quality, so their data was likewise omitted.

Results were mixed. Scoring poorly (defined as 69% or lower) on the seven essays' worth of revision achievement frequently did not correlate with a poor average (also defined as 69% or lower) on the two final essays; failing to adequately explain revisions did not necessarily mean they would fail to achieve on the final essays. However, the 45 students who received 70% or higher on their revision explanations almost always received scores above 70% on their essays. Only two students with high revision scores received under 70% on the essay average, and one of these students had a 43-point difference between her two essays; she received an 85% on the first scored essay but only a 42% on the second after submitting only a partial paper. When examining the 59 students who achieved "successful" essay scores, all but 14 also received "successful" revision scores. 34 students received an 80% or higher as an average on their two final essays; of these, 20 also achieved at least 80% on revisions, and all but six received at least a 70% on revisions. Students in this study were very similar pre-intervention in terms of high school grades and SAT scores, covering the bases of effort and test taking ability, yet those who were consistent in providing revision explanations received higher essay scores overall, suggesting a positive correlation between metacognitive revision and achievement.

Most students' revision scores, whether higher or lower, were within 16% of their essay average. While this is a rather large gap, there are many factors that may account for this. For one, since the final research essay was due at the very end of the semester, students reported high levels of stress and may not have performed at their best; indeed, scores on the second to last essay were often higher than on the last essay, yet these scores were averaged.

When performing a regression analysis of the revision average score's impact on the average on the two final essays, the linear correlation was .412. Figure 1 uses a scatter diagram to explore this relationship.
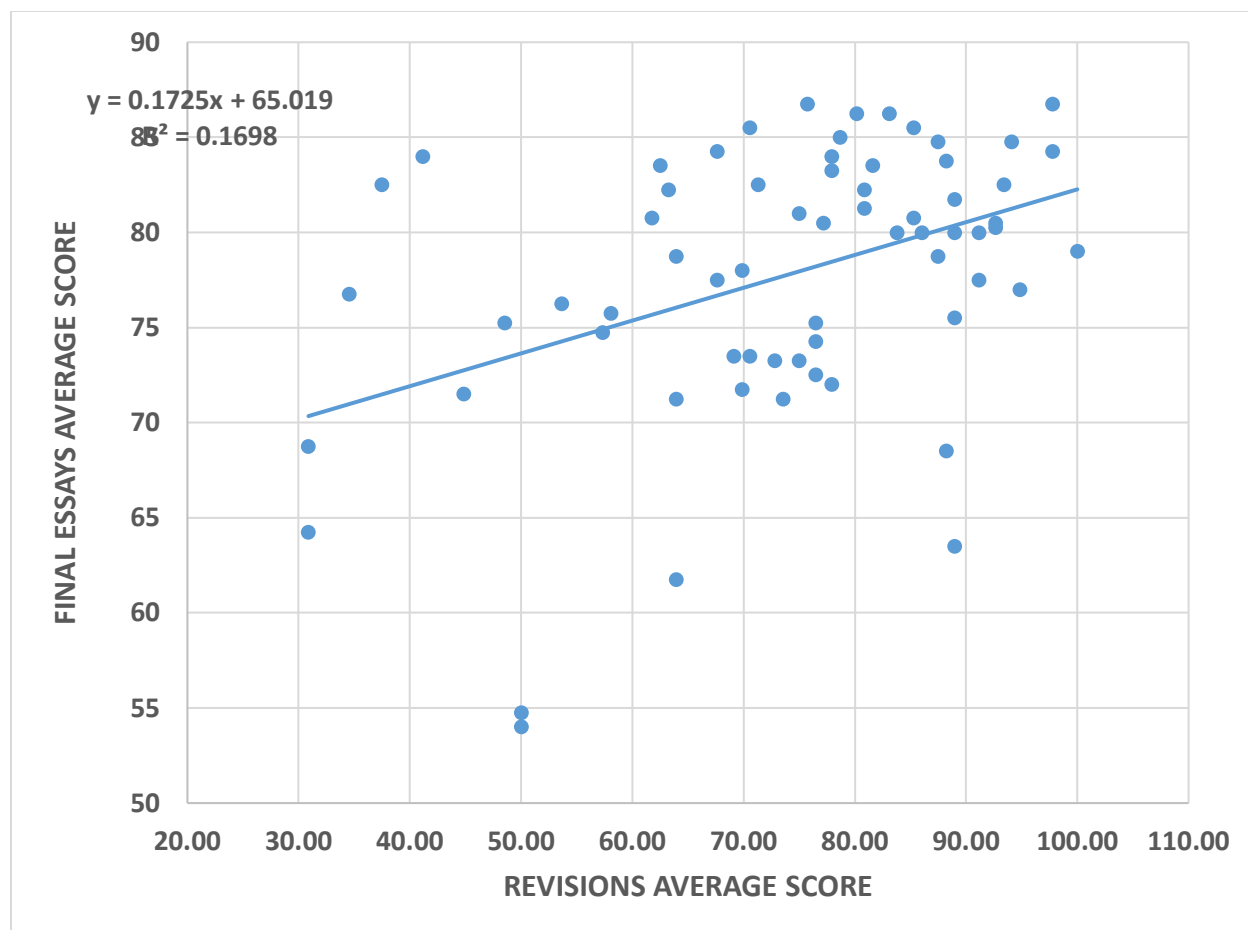
Figure 1. Revision scores' impact on final essays' scores.

While this is a positive correlation, the R-squared value of .170, out of a maximum 1.0, shows that the revision score was not a strong predictor of the average score of the final essays.

Improvement from Baseline to Final Essays

Unsurprisingly, overall writing achievement increased from baseline to final essays. Students involved in any course with sustained writing instruction would be expected to improve no matter which intervention techniques were utilized. For this study, though, the gains appear small. As shown in Table 1, the difference between the baseline mean to that of the final essays indicates an improvement of only 3.03 points (4.04%). Some individuals' drastically lower scores on the final essays impacted the overall mean; in particular, two students' scores dropped over 20%. However, most students (46 of 65, or 70.8%) improved from baseline to final essay, with 18 of 65 (27.7%) of students improving scores by over 10%.

Table 1. Summary statistics from baseline to final essays of sample

	Baseline essay	Final essays' average
Mean	74.60	77.63
Median	73	80
Mode	73	80
Standard deviation	6.24	7.17
Range	30	32.75
Minimum	57	54
Maximum	87	86.75

Note: N=65

If the data are further separated, a much stronger effect emerges from the lower baseline achievers. As showcased in Table 2, the mean of the baseline to final essay improvement difference is 5.69 versus 3.03 for the total group, with 27 (81.8%) of the 33 raising their scores. Furthermore, 14 (42.4%) of students in the lower half improved their scores by over 10%, of which 11 (33.3%) improved scores by at least 15%. For the upper half, only four students (12.1%) improved scores by at least 10%.

Table 2. Summary statistics from baseline to final essays of lower baseline achievers

	Baseline essay	Final essays' average
Mean	69.61	75.30
Median	70	75.50
Mode	73	80
Standard deviation	4.05	8.11
Range	16	32.75
Minimum	57	54
Maximum	73	86.75

Note: N=33

While this fails to factor in the individuals' scores on their revision attempts, all students participated in the metacognitive revision intervention, suggesting that students who entered the class with lower writing abilities benefitted more substantially from the intervention than their higher-scoring classmates.

Types of Revisions

Table 3 shows student examples of the different categories of revision (global and local) and edits (not classified in this study as an acceptable form of revision, but still coded due to frequency). It should be noted that students were allowed to complete extra revision explanations to receive full credit, but only the ones that received scores were coded; that is, if a student had already received full credit, those revisions were not coded. However, with many students losing a half to one and a half points per revision explanation, some students received more than six codes per assignment.

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Table 3. Coding scheme for type of revision

Type	Student Example
Global	I changed the sentence "and making their life appear to be the life other's would want to live" to "and presenting themselves as something they are not, instead of accepting themselves." The sentence I had before was not specific enough while talking about body image. Now, it is evident that I am trying to make the point of accepting yourself rather than try to be what people call perfection.
Local	I changed "marijuana legalization" to "legalization." I made this revision because I didn't want to use repetition in this paragraph that often. This makes the reader have to read the same word less amount of times so it doesn't get annoying.
Edit	I changed the word "belief" to "believe." I changed the word to believe because it was a grammatical error that made the sentence confusing to the reader. By making this revision, it fixes the simple error and makes the sentence easier to read.

Students received points for thoroughness of explanation; they did not receive increased points for a global over a local revision. While a local revision such as changing diction would likely have been easier to explain, it was interesting that there were far more global revisions. Of the 2,226 coded revision explanation attempts, 1,444 (65%) were global, 704 (32%) were local, and 78 (less than 4%) were merely edits. However, just because a student attempted a high-level revision does not mean he/she received a good score on that explanation, as the explanation itself was incomplete. Table 4 provides the rubric along with sample student responses in each category.

Table 4. Revision explanation rubric with student examples

Score	Description	Student Example
2	The response is a thorough explanation of what was changed that is supported with specific and relevant information on why the change was necessary; the revision is significant in improving the quality of the text.	Added the sentence "Specifically, I want to travel to France, London, and Australia" because it makes it clearer to where I actually want to travel and the places that are my muses. This makes it clearer for the reader because instead of just the general idea of traveling all over the world it tells them exactly where I want to go.
1-1½	The response is a partial explanation of what was changed that is only supported with some information on why the change was necessary; the revision may only make an insignificant contribution to improving the quality of the text.	Added a sentence to show that I had a lot to strive for. The change shares a piece of information about my mom that shows how important grades are to me.
0-1	The explanation is **absent** or focuses upon something that cannot be classified as a revision, such as a change to **formatting** or **grammatical edit**.	I deleted the comma and added a semicolon. I changed it because it was correct symbol to use. It made the sentence grammatically correct.

The first response receives full credit since it explains all three bullet points: what was changed, why it was changed, and how it's better/clearer for the reader; the grammatical errors do not cause the response to lose credit, as this was not the focus of the exercise.

The student whose response earns a score in the second category had attempted a global revision, and the change was likely significant in improving the development of his essay, yet he failed to earn full credit due to not stating his change directly and failing to fully explain the significance of the change.

When examining the relationship between types of revisions and final essay scores, there was little correlation. Though past research (Beach & Friedrich, 2003; Patthey-Chavez et al., 2004; Zhang et al., 2017) found strong relationships between significant revisions and achievement, the correlation coefficient of .193 shows that, for this study, the type of revision did not predict success on the final essays' scores. Interestingly, though the metacognitive revision assignment was formulated as a method to increase writing achievement and not an end in itself, there was a relatively high correlation (.619) between the number of global revisions and the revision explanation scores; thus, students who attempted global revisions were more likely to receive higher revision explanation scores.

Perceptions about the Writing Process

76 students completed the pre-intervention writing survey, and 82 completed the post-intervention survey. The survey was anonymous, so individual responses were not cross-checked for change; it is also possible that not all 76 of the original responders completed the post-survey. Therefore, I was unable to conduct a paired comparisons t-test, and change was noted in percentages of the entire population.

Table 5 provides attitudinal survey results. In several areas, students' perceptions of the writing process indicated positive changes, sometimes drastically so. For example, while only 26% of students in the pre-intervention survey chose "strongly agree" or "agree" for the statement "I believe that I am a strong writer," 43% selected one of these designations at the end of the semester, with other gains in writing enjoyment and motivation. Significantly more students reported greater self-efficacy in task completion with fewer indicating feelings of helplessness. Though more students stated they enjoyed giving feedback, fewer expressed that they wanted to receive it or felt that their writing could improve with feedback and revision. Additionally, fewer students from the pre- to post- survey indicated that writing reflection would improve their performance. For the purpose of understanding changes to overall feelings, I collapsed positive responses into one category.

Table 5. Pre-post survey results

Directions: Indicate your feelings about each statement.	Collapsed "strongly agree" and "agree" pre-intervention responses	Collapsed "strongly agree" and "agree" post-intervention responses	Change in percentage from pre-post
I enjoy writing.	24 (32 %)	31 (38%)	+6
I believe that I am a strong writer.	20 (26%)	35 (43%)	+16
I feel that pre-writing is important in the development of writing.	47 (62%)	60 (73%)	+11
I feel motivated to work on writing assignments.	25 (33%)	30 (37%)	+4
Sometimes I want to complete a writing assignment, but I don't know how to get started.	58 (76%)	54 (66%)	-10
I feel confident that I can complete writing assignments that are given to me.	49 (65%)	63 (77%)	+12
I want to receive feedback on my writing.	70 (92%)	69 (84%)	-8
I enjoy having the opportunity to give feedback to my classmates about their writing.	29 (38%)	40 (49%)	+11
I believe that my writing can improve if I use feedback from my professor and/or classmates.	67 (88%)	68 (83%)	-5
I believe that revision is important to writing.	70 (92%)	64 (78%)	-14
I believe my writing skills will improve if I revise my writing.	67 (88%)	65 (79%)	-9

I believe that reflecting on my performance as a writer can help me improve my writing.	65 (86%)	61 (74%)	-12
I believe that my effort, rather than just my finished product, should influence my grade on a writing assignment.	72 (95%)	68 (83%)	-12

Notes: N=76 for pre-intervention survey; N=82 for post-intervention survey. Percentages were rounded to whole numbers.

Since the backbone of the instructional intervention centered on metacognition and feedback, some of these results were disappointing. Though students seemingly saw value in the intervention based on self-reported improvement in their writing, the drop in "strongly agree" and "agree" responses on the revision and reflection questions may indicate feelings of burnout and/or frustration to the multi-faceted, task-heavy process approach; while the survey itself did not provide students with opportunities to express why they had these feelings, some students complained verbally to me that the process was "too much."

Although their study was not particular to writing, Akbaşlı, Arastman, Gün, and Turabik (2019) examined factors that affect student burnout and found that students who exhibited higher degrees of school engagement were less likely to fall prey to this problem. The researchers concluded that "social support" from the instructor and university, as well as the development of a positive relationship between the student and instructor, can increase school engagement and thus mitigate the stress and detachment leading to burnout (p. 303).

Anecdotally, several of my students who attended office hours to receive one-on-one support with their revision explanations expressed that they saw worth in the process and felt that it helped them become better writers. However, not all students take advantage of office hours, suggesting that students may need more support during class time. Instructors who use the metacognitive revision approach should provide adequate scaffolding and practice so that students understand the requirements as they progress through the stages of the intervention. Additionally, instructors should reinforce the purpose and benefits of metacognitive revision to increase the likelihood of students valuing the process and transferring the skills to new learning contexts.

Limitations and Implications for Future Research

There were several limitations to this study. Due to my operator error of failing to record quality scores for the fourth class's final essay, I was unable to use their data for the first and second research question, reducing my population by 23, a significant portion of an already small sample. A larger-scale, replicated study using multiple instructors and students from diverse universities may show different results.

Additionally, a truer relationship between metacognitive revision's effect on achievement could have been explored if students' baseline essays were more equivalent to their final essays. The first essay of the semester only required students to write a personal reflection on their inspirations, goals, and plans for achievement; in contrast, the last essay demanded the integration and documentation of evidence from multiple sources to support an argument. Gains in achievement may have been more pronounced had the tasks been of similar difficulty.

Timing may have negatively skewed results, as well. Based on anecdotal evidence, it should be noted that students' first efforts at the beginning of the semester were often higher than those of their efforts when submitting the last of the two late-semester essays, which was a research paper due right before the week of final exams. Several students confessed that they were too stressed to submit their best work and completed a minimal effort. Of the two students whose scores dropped over 20% from baseline to the average of the final essays, one submitted only a few paragraphs, and the other

submitted a research paper that was partly plagiarized. Both students received extremely low scores on this final paper in comparison to the other late-semester essays they submitted.

The largest area of concern in the study is that of my dual role as researcher and instructor. Due to limited resources, I was the sole person scoring and coding revision explanations as well as scoring late-semester essays. Thus, no interrater reliability was established, and my own scores, though rubric-based, still carry a degree of subjectivity. In a future study on the impact of metacognitive revision, validity could be better established by incorporating additional scorers and coders who were not personally connected to the students as their instructor.

Finally, based on the results of the survey, more should be done to investigate why student interest in feedback and revision decreased over the course of the semester. If the researcher could understand these negative attitudes, there is potential to redesign aspects of the intervention itself to decrease these feelings.

Conclusion

This study's findings add to the body of evidence signifying the usefulness of metacognitive approaches, feedback, and/or an emphasis on self-improvement to strengthen writing confidence and achievement (Riddell, 2015; Wingate, 2010; Zinn, 1998). The correlation was not as strong as expected, somewhat echoing the disappointing results of Trapman, van Gelderen, van Schooten, &and Hulstijn (2018), who reported that "metacognitive knowledge was not found to be a significant predictor of level of writing proficiency" in their study of low-achieving adolescents (p. 912). However, the present study found a positive relationship between metacognitive revision and writing achievement, and students largely indicated increased positive feelings about their writing, suggesting that this instructional approach has merit.

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