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Drawing on Readerly Intuition in Sentence Level Feedback

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Résumé de l'article

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Article

Drawing on Readerly Intuition in Sentence Level Feedback

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Abstract

In this paper, we discuss our research into the use of sentence-level feedback at one stage in a scaffolded assignment in a large second year science course. The assignment involved submitting a lab report in three stages: Introduction, Results & Discussion, and then a final submission of all the parts in revised form. At the start of the term, teaching assistants and students were provided with a list (with explanations and examples) of 10 common sentence level issues; for the results and discussion submissions, teaching assistants were required as part of their feedback to identify at least one of these issues in each student's writing. This section was selected due to it being the penultimate stage: it was hoped that feedback here would be applied to the students' final submission. We analyzed the feedback and the response to feedback in 62 randomly chosen samples of student writing from the course (circa 16% of the class in total). We examined the issues from the list that teaching assistants preferred to give feedback on, the sorts of feedback that students were most likely to act on, and the success of student revisions arising from the various forms of feedback. We found that teaching assistants preferred to give feedback on issues related to what we would describe as more intuitive, readerly aspects of sentence-level writing (such as awkward phrasing), rather than on technical grammatical issues (such as clarity of antecedents for pronouns); this former sort of feedback also led to the most revisions, and the most successful revisions, on the students' parts. Accordingly, we argue that focusing on this more intuitive approach might be a fruitful strategy

for teaching assistant training, since it would both play to their preferences and to student preferences.

Introduction

Helping students develop the ability to write grammatically correct and syntactically clear sentences is an important step to helping them develop their abilities to communicate effectively and to critically reflect on their work. If students are to showcase their ideas by engaging with the Burkean parlour of their field, then they must be able to convey those ideas clearly, intelligibly, and according to the formal conventions of their academic discourse community. Although the debate over the effectiveness of grammatical corrective feedback persists (e.g., see Mohebbi, 2021), numerous studies have shown that such feedback is indeed useful (see Kang & Han, 2015 for a review), and for many researchers, the question of whether corrective feedback is a good idea has shifted to the question of how to do it effectively (Bitchener & Storch, 2016).

The debate over the best approach to corrective feedback centers on three broad types of such feedback: direct, indirect, and metalinguistic corrective feedback. Direct corrective feedback refers to explicitly identifying an error in student writing and recasting it in a corrected form. It has been shown to be effective for improving students' accuracy (Bitchener, 2008). However, students who receive direct corrective feedback may just correct the isolated errors, without fully understanding the errors (Shintani & Ellis, 2013). Alternatively, indirect corrective feedback identifies errors, but does not offer any correction or explanation of the error: it is up to the students to figure out what is wrong with their writing and fix it. This approach to corrective feedback is also problematic because it can put too much onus on students to figure out what went wrong, which is particularly problematic for new language learners (Nemati, Alavi, & Mohebbi, 2019).

One means of addressing the shortcomings of direct and indirect corrective feedback is with another approach: metalinguistic corrective feedback. With this approach, rather than simply identifying errors and/or providing corrected forms, students are given explanations of various grammatical rules, which they can use to identify errors in their own writing and make appropriate changes. This can lead to deeper learning since students must understand the grammatical rules in order to apply them in their own writing (Shintani & Ellis, 2013). The metalinguistic approach can be complemented with either direct or indirect corrective feedback —students can be given the corrected form along with an explanation, or the specific errors can simply be identified. While the findings by Shintani and Ellis (2013) suggest that metalinguistic corrective feedback does not lead to

greater improvement in writing than direct corrective feedback, their study only provided students with a handout that contained several metalinguistic explanations. Studies are needed that combine metalinguistic corrective feedback with other forms of corrective feedback.

One form of corrective feedback that can could complement metalinguistic corrective feedback is exemplar-based corrective feedback, which involves identifying an error and providing the correct form in an exemplar that illustrates the grammatical rule underlying the incorrect form (Thomas, 2018). Thus, rather than recasting the problem with the correct form, as is the case with direct corrective feedback, exemplar-based corrective feedback provides a similar example of the correct form and leaves it up to the student to apply the underlying rule to correct their writing. Exemplar-based corrective feedback complements metalinguistic corrective feedback in that students are first given the explicit grammatical rule, and then that rule is illustrated with an example. This was the method tested in our study: we provided examples of both the error and the corrected form, along with an explanation of the correction and the grammatical rule.

One potential gap in the research discussed immediately above on the efficacy of different approaches to corrective feedback is that it is exclusively focused on English Language Learner students in experimental or writing classroom settings. There is considerably less discussion of the question of how or whether instructors and graders in other disciplines should provide sentence-level feedback—particularly with regard to large first year courses that often have significant writing components, and where the feedback comes from graduate teaching assistants who are not trained as writing instructors. If corrective feedback can be helpful for L2 students' writing accuracy in certain settings, it is at least possible that it could also be helpful beyond the specifically L2 writing classroom: corrective feedback should be helpful for all writers.

Research on feedback in more general disciplinary settings has shown that students do value feedback (Pereira et al 2016), but that it is not always used (Li and De Luca 2012; Price et al 2010). For feedback to be most effective, assessment and feedback need to be coherently integrated into the overall course context (Gibbs and Simpson 2004), with certain approaches to feedback being more effective for certain assignments—for example, as Jonsson notes, "if the students are engaged in one particular assignment, which is to be revised, they want more corrective feedback so that they can make improvements for the final version" (Jonsson 2012, p. 67; see also Glover & Brown 2006). As well, students need illustration and guidance in order to make productive use of feedback (Agius & Wilkinson 2014; Bailey 2009; Doan 2013; Douglas et al 2016; Pokorny & Pickford 2010; Robinson et al., 2013; Winstone et al 2017), particularly in early years (Pokorny & Pickford 2010; Robinson et al.,

2013; Skinner et al 2014): as Bailey notes, "[s]tudents want more than comment and criticism, or to be left to compute through logical deduction or inference what is intended; they want to know 'how'" (2009, p. 12). Orsmond and Merry, speaking specifically of Biology students, bring out the importance of ensuring that students understand the basis for the feedback, so as to ensure that they are not working in "a disempowered way" (2011, p. 133).

Based on this research and to maximize the possibility of feedback being effectively used, we closely integrated assessment and feedback and ensured that feedback to the students was constructive and practical. Specifically, students were explicitly taught about the feedback, its importance, and strategies for addressing it; students were also given access to a resource (reproduced in the Appendix) that provided technical definitions of issues as well as how they looked in both disciplinary and everyday contexts and strategies for addressing them; and the writing assignment was heavily scaffolded so as to emphasize the processual and revisionary aspects of writing.

In this study, we assess the effectiveness and practicality of implementing sentence-level corrective feedback in a large, second year, science course in which graduate teaching assistants, who are trained in and focused on science, not writing, are the primary source of feedback. In such a setting, practicality and scalability are crucial, since providing corrective feedback can be very time consuming and technical (Polio, 2012). Teaching assistants cannot and should not be expected to focus on grammar at the expense of disciplinary knowledge; as well, they cannot be expected to be expert grammarians. Previous research (Cripps, Hall, & Robinson, 2016; Rodrigue, 2012; Rodrigue, 2013; Winzenreid, 2016) has shown that teaching assistants "occupy complex liminal positions: neither fully inside the discipline nor fully outside, neither experts nor novices, and yet both teachers and students" (Winzenreid 2016, "Introduction"), and this liminality extends to writing instruction. The publication of Beth Hedengren's *A TA's guide to teaching writing in all disciplines* (2004) helped both to provide a resource, and to identify an aspect of teaching that was in need of attention. As she and others note, teaching assistants frequently lack training in writing instruction and, particularly for newer teaching assistants, may not see themselves as teachers of writing (Rodrigue, 2013); as well, they may not receive support in their writing assessment (Rodrigue, 2012).

Our interventions helped to address some of the issues noted above by using a metalinguistic and exemplar-based approach to corrective feedback that helped to train both teaching assistants and students in common sentence-level problems in student writing. As will be discussed, we provided a writing guide that helped both teaching assistants and students identify writing issues. This guide

had both metalinguistic explanations and discipline specific exemplars that illustrate the explanations. We trained the teaching assistants in using the guide; as well, this guide, the training, and the requirement to give students feedback on their writing helped reinforce the idea that expression was an important aspect of student work, just as content was.

Our expectation was that this research would inform us about students' revision practices and the effectiveness of different areas of feedback, which it did; however, we also (somewhat unexpectedly) found that our examination also seems to have significant ramifications for the development of our teaching assistant training and benchmarking practices. Our examination suggests to us that for our teaching assistants and students, we could improve the quality and retention of teaching assistant sentence-level feedback by encouraging teaching assistants to give writing mechanics feedback that was more based on their perception of a text's feel and flow than on prescriptive grammatical rules.

Methods

Our work took place in a second year Science course at University of Toronto - Mississauga with circa 400 students enrolled and eight teaching assistants involved in the marking of the assignment. The main writing component of the course was a lab report, which was set up as a scaffolded submission with the following stages spread through weeks 4 to 12 of the term:

1. Introduction
2. Results & Discussion
3. Full Report (the above parts brought together and revised based on received feedback)

Students received feedback on their writing at stages 1 and 2. For the stage 2 feedback, teaching assistants based their comments on the following list of pre-determined sentence-level issues: Awkward Phrasing, Comma Splices, Overuse of Passive Voice, Run-On Sentences, Sentence Fragments, Subject-Verb Agreement issues, Inappropriate Tone, Inappropriate Tense, and Unclear Pronoun Antecedent. As Anson et al. (2012) note, assessment tools and materials need to be developed out of their unique contexts of use: they stress "the importance of deriving assessment criteria from specific contexts and occasions for communication" (Anson et al. 2012, p. 2). In their article, they describe their process of generating authentic and useful assessment criteria as "a series of facilitated discussions in which departmental faculty react to student writing samples and survey data and then react to their reactions" (Anson et al 2012, p. 3). Like them, we developed our list by creating a list of issues based on our experience working with the writing of University of Toronto - Mississauga's Biology students—two of us have worked as writing specialists and writing instructors

for eight (Kaler) and three (Vroom) years respectively at University of Toronto - Mississauga; the third (Richter) is a science professor with a strong interest in student writing. We then refined the list by examining a sample of papers in the 60-70% range from the previous year, noting sentence-level issues that occurred in multiple papers, and that seemed like the kind of things students and teaching assistants could realistically be expected to understand and address. Thus, the final list was generated from this application of our experience and expectations to the corpus of competent but not exceptional work from the previous year.

This list then formed the basis for a 10-page writing guide in which the issues were identified and defined, examples were shown, and strategies for fixing the issues were provided. We collaboratively designed the writing guide to aid the teaching assistants in their feedback. Specifically, for each of the issues, it described the issue, gave an example of it in everyday writing, gave an example of it in writing adapted from a Biology research article, and provided potential solutions to the problem with explanation of the solutions. The writing guide was introduced to students in an hour-long presentation in class before they submitted the Introduction—Covill (2012) notes the importance of exposing students to the rubrics that will be used to assess their work; Carter and Thirakunklovit (2019) note the importance of giving students guidance in responding to feedback, which the guide could, to some degree, provide. The guide also formed the basis for an hour-long teaching assistant training session prior to the grading of the Introduction. The guide was made available to students and teaching assistant on the course website.

Teaching Assistants were asked to flag at least one issue from the list as part of their written feedback to each student on the second submission (the discussion and results section): we felt that obliging them to note one issue was reasonable, whereas requiring them to note more would have become unduly time-consuming and onerous. Of course, the list is not exhaustive, and teaching assistants were free to point out other issues that they saw—but they were required to flag at least one item from the list, if any of them occurred. For each issue they noted in their feedback, they were also to identify (through highlighting) a place where it occurred in the student's text (students were able to see their text with comments/highlighting as well as their feedback in the course management software).

Before the first submission, students were asked to fill out a consent form permitting the use of their work in our research; from the consenting students, 72 submissions (18% of the total circa 400 students enrolled in the course) were randomly chosen from within predetermined grade ranges for their final grades in the course. We felt that students in the B (70-79%) and C (60-69%) grade range

would have more room for improvement than, and be more likely to show changes than, students in the A (80-100%) or D (59% or lower) range, and so we selected twice as many B and C students (24 in each range) as students in the A or D range (12 each). Of the 72 students selected at the start of term, 10 were dropped from this study: six failed to complete the various stages of the scaffolded assignment, and four did not receive any sentence-level feedback on their discussion and results submission from their teaching assistant. Of the 62 students remaining, 11 were from among the consenting students whose averages were in the A range, 20 were from among the consenting students whose averages were in the B range, 21 were from among the consenting students whose averages were in the C range, and 10 were from among the consenting students whose averages were in the D or lower range.

Their work was anonymized and then analyzed by a research assistant (RA) who looked at changes between submissions 1-2 (the introduction and results & discussion), 2-3 (results & discussion and the submission of the revised entire report), and 1-3 (introduction and the submission of the revised entire report); one of us graded several examples with the research assistant to ensure that our expectations were aligned. This research was approved by the University of Toronto research ethics board, protocol #38016: consent from students was obtained through distribution of a consent form in a presentation in which the project was introduced, its relevance was discussed, and confidentiality procedures were detailed, including the fact that work would not be done until the course was over, that writing samples would be anonymized and assessed by people unconnected with the course, and that at no point would course staff know who had consented or been selected. The presentation was conducted by Kaler, with the instructor (Richter) and other course staff absent from the room. After the course had ended, a research assistant unconnected with the course recorded the names of consenting students, selected from them the students whose work would be analyzed, and anonymized their writing samples; these samples were then assessed by another research assistant, also unconnected with the course.

Results

We wanted, first of all, to know what aspects of student writing teaching assistants were most attuned to. The number of times that each issue was mentioned is as follows (teaching assistants could indicate more than one issue in submissions, although most of the time they did not, so the total below is higher than 62).

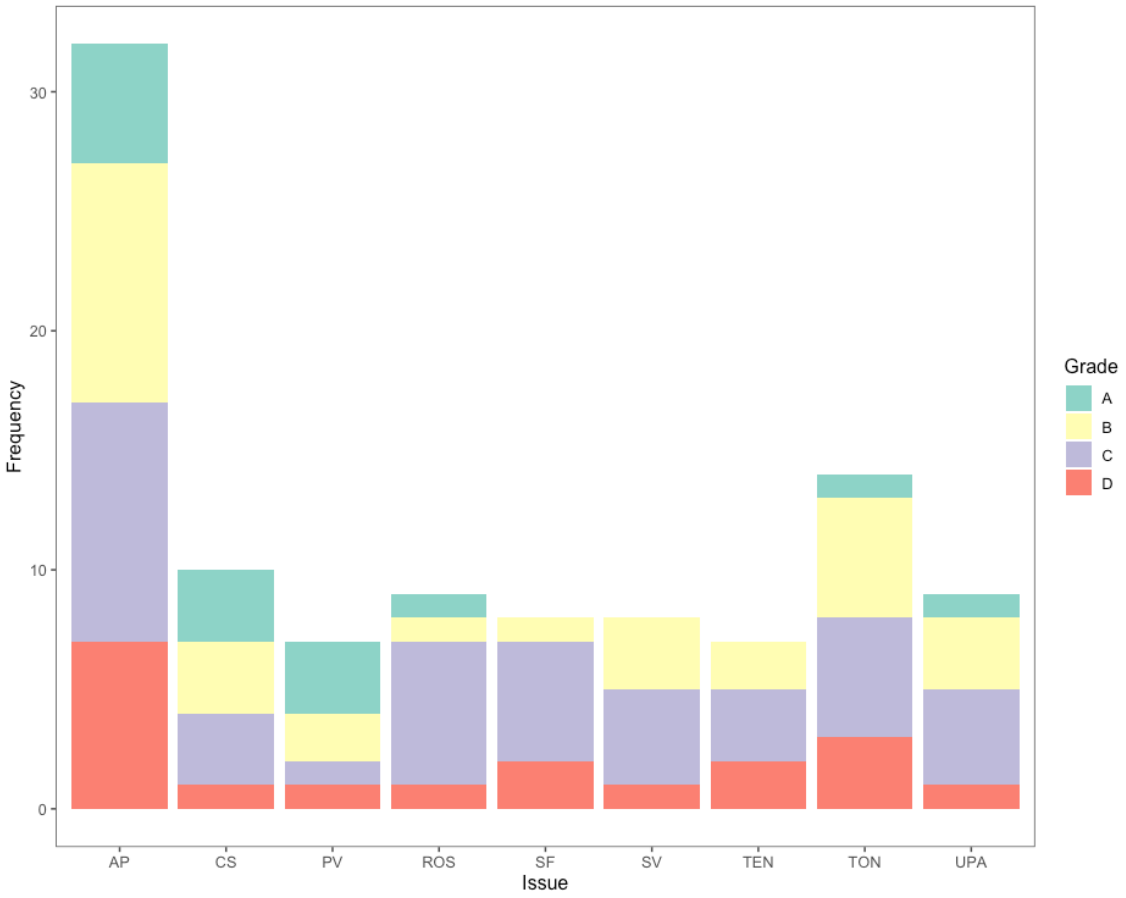

Figure 1. Barplot displaying the frequency with which each issue occurred by grade levels. Abbreviations refer to sentence level issues (AP = Awkward Phrasing, CS = Comma Splices, PV = Overuse of Passive Voice, ROS = Run-On Sentences, SF = Sentence Fragments, SV = Subject-Verb Agreement issues, TON = Inappropriate Tone, TEN = Inappropriate Tense, UPA = Unclear Pronoun Antecedent.

Awkward Phrasing was by far the most common issue identified; it is also the one that requires the least technical training to assess and is the most subjective, either/both of which may account for its popularity. The reason that we feel that it requires less technical training is simply because there are clear grammatical rules for telling if independent sentences are joined merely with commas without coordinating conjunctions as in a Comma Splice, or if the subject of the sentence and the verb agree as in Subject-Verb Agreement, but there are no such clear rules for determining if a sentence is awkwardly constructed: ultimately, this relies on the reader's judgement. The next most common was Inappropriate Tone, which is similar in terms of not requiring technical training to diagnose:

rather, it depends on whether the sentence "feels" appropriately formal. The writing guide did give some specific examples of inappropriate choices (such as the use of contractions or overly evaluative language), but these were not exhaustive: again, the reader ultimately had to make a judgement call. The overwhelming popularity of these two issues suggests to us that teaching assistants were working from what might be called a "reader's perspective."

These patterns could be caused by variation in knowledge and experience of our teaching assistants. Consequently, we wanted to know if these Science teaching assistants, whose main focus was not on writing and who had not had a great deal of training in working with writing, were able to accurately identify issues in student writing. To investigate this, we compared whether their feedback focused on areas that the Research Assistant also found the student to be weak in. The Research Assistant for this project was experienced in sentence-level assessment, had an interest in writing skills, and had more experience in terms of academic writing and publishing than any of the teaching assistants. In 38.7% of the cases (24 times out of 62) the teaching assistant and the Research Assistant agreed on the most serious sentence-level writing issue; however, in all but one case the Research Assistant found that the issues identified by the teaching assistants were in fact issues in the writing in question, even if they were not the most significant—in other words, there was only one case in which the Research Assistant felt that teaching assistants had identified issues where those issues were not present.

When they did not agree with regard to the most significant issues, the Research Assistant felt that the presence of Comma Splices was a more significant issue than the issue identified by the teaching assistant in 42.1% of the disagreements (16 times out of 38 disagreements). This could have been because the Research Assistant was especially attuned to comma splices, but in reviewing the teaching assistant and the Research Assistant feedback we also found Comma Splices to be a major issue: they were not just a hobbyhorse that the Research Assistant was riding. Thus, it seems possible to us that course teaching assistants were not recognizing Comma Splices as an issue. The Research Assistant also indicated that the teaching assistants' feedback was overall clearly expressed in most cases, but there were 9 times (15%) when the Research Assistant found the feedback to be unclear.

As noted above, for the submission 2 (the Discussion section) feedback, teaching assistants were instructed not only to identify an issue, but also to indicate through highlighting one place in the student's text where the issue occurred. We explored next how students dealt with these examples as they revised their work for submission 3 (the final, complete version of the report).

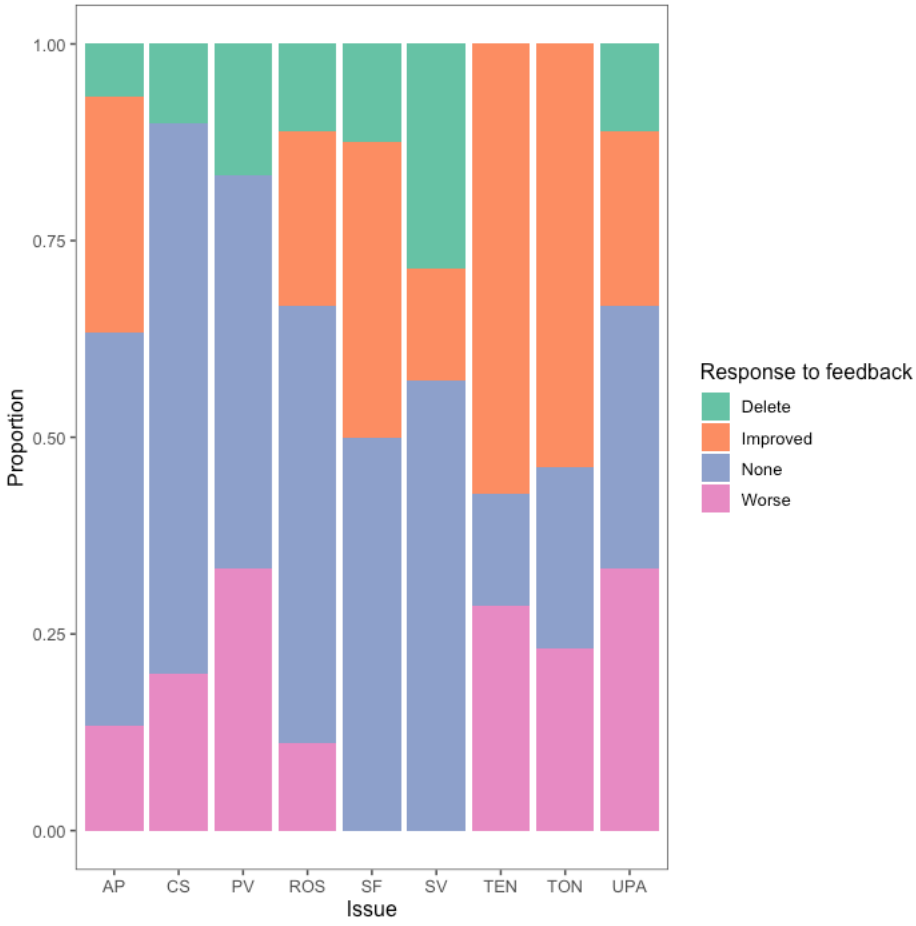

Figure 2. Stacked barplot showing how students responded proportionally to feedback from submission 2 to 3 by sentence level issue. Abbreviations refer to sentence level issues (AP = Awkward Phrasing, CS = Comma Splices, PV = Overuse of Passive Voice, ROS = Run-On Sentences, SF = Sentence Fragments, SV = Subject-Verb Agreement issues, TON = Inappropriate Tone, TEN = Inappropriate Tense, UPA = Unclear Pronoun Antecedent.

Mostly, students did not revise their texts (Fig. 2). Diagnoses of Inappropriate Tense and Inappropriate Tone have the highest proportion of changes that results in improvements in the relevant category (Fig. 2)—the category of Inappropriate Tone is especially noteworthy in that changes were made 78.1% of the time (11 changes vs. 3 no changes), with most changes (70%) being effective. These results show that students were receptive to this specific feedback. Awkward Phrasing feedback also produced as much change as no change (50% each), with most changes (60%)

being improvements. All three of these categories are relatively non-technical, compared with such categories as Comma Splice or Unclear Pronoun Antecedent.

Contrary to what one might have thought (e.g. Hyland 1998), deletion did not happen often: students mostly either left the issue in, or attempted to address it. Efforts made to fix issues related to Comma Splices, Overuse of Passive Voice, and Unclear Pronoun Antecedents made things a little worse. Work on Awkward Phrasing and Sentence Fragment issues tended to improve the writing with regard to these categories, with Sentence Fragment issues in particular showing that all attempted changes improved things.

We were also curious to see if students could apply teaching assistant feedback beyond the specific example identified by the teaching assistant—in other words, when given feedback on writing in their discussion and results section (submission 2), were they able to apply this feedback when editing their introduction (submission 1) for the final submission of the complete lab report (submission 3). Here too, we found that students who had received feedback about Awkward Phrasing, Inappropriate Tone, and Inappropriate Tense were most likely to show improvement in those categories overall for submission 3 (the complete report) as compared with submission 1: 66% improvement for Awkward Phrasing vs. 21% worsened, 46.1% improved for Inappropriate Tone vs. 23% worsened, 57.2% improved for Inappropriate Tense vs. 42.8% worsened.

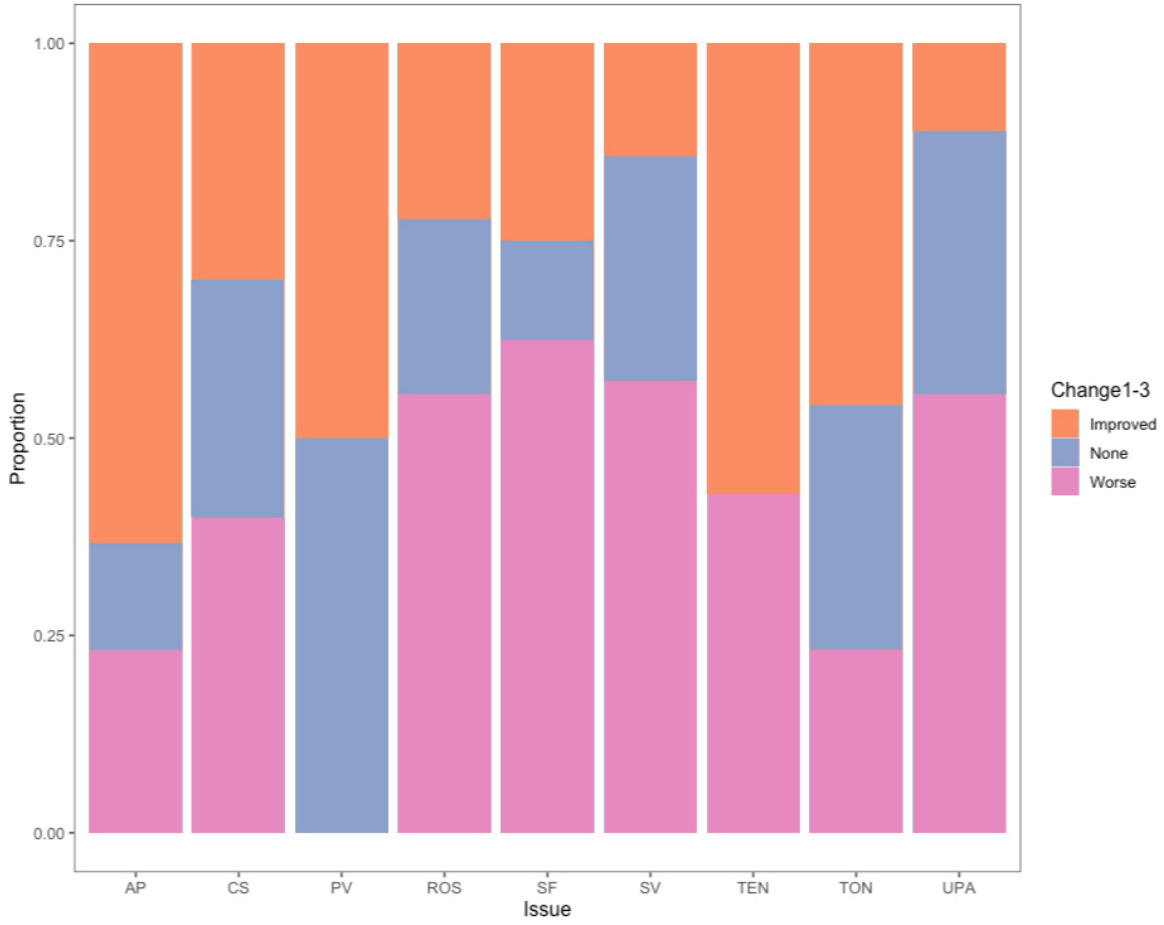

Figure 3. Stacked barplot showing proportion of mark changes by sentence level issue. Abbreviations refer to sentence level issues (AP = Awkward Phrasing, CS = Comma Splices, PV = overuse of Passive Voice, ROS = Run-On Sentences, SF = Sentence Fragments, SV = Subject-Verb Agreement issues, TON = Inappropriate Tone, TEN = Inappropriate Tense, UPA = Unclear Pronoun Antecedent.

Discussion and Implications

Our goal in this study was to assess the viability of drawing on metalinguistic and exemplar-based Corrective Feedback to assist teaching assistants in providing students with sentence-level instruction, as a means of moving grammatical and syntactical instruction beyond the writing classroom into large undergraduate courses. We should explicitly acknowledge the "elephant in the room" (as one reviewer put it) here, which is that many students did not address the issues that were identified: in 55% of the cases between submissions 2 and 3, students either deleted or did change

the identified issues; in 17%, they attempted changes but made things worse. Our conclusions below should be read with this in mind.

We do not feel that it is coincidental that sentence clarity (Awkward Phrasing), which is among the least "technical" of the items included in the rubric, was overwhelmingly singled out by the teaching assistants: as we discussed above, diagnosing it requires much less technical grammatical knowledge than diagnosing e.g. Comma Splices or Unclear Pronoun Antecedents. By the same token, diagnoses of sentence clarity, followed by tone and tense issues, were the most likely to result in improvements in that category for the final submission. This suggests to us that sentence-level feedback was both most accessible for teaching assistants and most productive for students when it was addressing more commonplace and intuitive aspects of writing, as opposed to when it was pinpointing specific grammatical issues (such as e.g. unclear pronoun antecedents), which might have been seen (by either or both parties) as too technical or complicated.

A notable limitation of this study has to do with the lack of demographic information about the students whose work we analyzed, or the teaching assistants who gave feedback. It would be interesting in future work to be able to be able to relate reception and use of feedback to students' ages, linguistic background, and year of study, as well as to be able to speak with students about why they did or did not address errors in their work; similarly, it would be interesting to see how feedback practices varied depending on teaching assistant experience and training. Another limitation arose from the overall context of the assignments within the academic year: as mentioned above, the final submission of the complete report was due at the busiest time of the term, and we suspect that this might have affected students' willingness (or ability) to engage with the feedback they received.

The most suggestive aspect of this research, for us, relates to teaching assistant competencies. In diagnosing these more intuitive issues, teaching assistants can speak as skilled readers, which they mostly are, rather than as writing experts, which they often are not. We can safely assume that anyone in a teaching assistant role is at least familiar with writing in their discipline, but they may not be formally trained to analyze that writing (see e.g. Rodrigue 2013; Alford 1997). Focusing on intuitively graspable aspects of student writing permits them to speak from that readerly place of competence, as well as cutting down on the temptation to be overly (and sometimes mistakenly) prescriptive in their comments; in addition, one might assume that it helps to lessen the "frustration" that Alford (1997) reports teaching assistants feeling when they are expected to speak as writing experts. Although there was enthusiastic support for the project from both the instructor and the lead teaching assistant, and there was some training and benchmarking done with teaching

assistants, and the writing guide was provided, the feedback was nevertheless given by disciplinary teaching assistants who would not necessarily have been very familiar with grammar and the analysis of sentence level issues. A diagnosis of sentence clarity issues can be based on the reader's subjective encounter with the text, whereas a diagnosis of unclear pronoun antecedent issues requires more technical knowledge and, probably, more time.

As two of the authors of this article do a considerable amount of teaching assistant training at our institution, and as many of the teaching assistants we train work in courses taught by the third author, we could not help but think about these results in a training context. Our work with this research project suggests to us that when we train teaching assistants to give feedback on sentence-level aspects of student writing, we should not focus on training teaching assistants to pretend to be expert grammatical analysts; rather, we should focus on helping them to speak as readers of students' work. This research provides a hint that "how did you feel about this piece of writing?" might be a better question to use in teaching assistant training than "can you identify what is wrong with it?"—better for the teaching assistants, and better for the students whose work they are discussing, and who are less likely to leave this kind of feedback as "dangling data" (Sadler 1989). This is especially important given that, as we discussed above, students mostly did not even try to fix the issues identified in their work, meaning that a significant amount of teaching assistant time was simply wasted. If shifting our approach to giving feedback could both help teaching assistants and cut down on this waste of resources, it would be a shift well worth making.

Acknowledgements

This work could not have been carried out without the assistance of several people and institutions, for which we are very grateful. We would particularly like to thank the teaching assistants in the University of Toronto – Mississauga course BIO205 in fall 2019, and all the students who permitted their work to be analyzed.

Appendix A: The Writing Guide Used By TAs and Students

Sentence Fragments

	Simple Writing	**Scientific Writing[1]**
Examples	1. The students who studied hard. 2. Were pleased with their grades on the exam.	1. Significant improvements in light environments were observed in artificially created gaps in the forest canopy. Thus resulting in better growth performance of the light-demanding plants on the forest floor. 2. In a study looking at two canopy gap sizes in central New Zealand, Forbes et al. (2016) found significantly higher natural regeneration of light-demanding plants than planted seedlings in gaps with at least 50% light transmission. Although larger canopy gaps with 84% light transmission were more favorable for planted seedlings.
Explanations	**All sentences must have a main subject and a main verb. A sentence fragment happens when you are missing one or both of those things**. The first sentence above is just a subject; there is no main verb—the students are not doing anything. The second sentence does not have a subject: Who were pleased about their grades. All sentences must have a main subject and a main predicate**.**	In these examples, the underlined texts are sentence fragments. In the first, there is no main subject; we don't know what is resulting in better growth. There are at least two ways of fixing this: 1(a) replace the period with a comma, which makes the entire line a subordinating clause, that explains the result of the first half of the sentence; and 1(b) provide a subject for the sentence: This. The second example is a sentence fragment, because the word "although" marks a subordinate clause. Even though that clause has a subject (canopy gaps) and a verb (were), they cannot be a main subject and main verb because the 'although' tells the reader that this clause is a subordinate clause, and a subordinate clause always has to modify a main clause. There are at least two ways to correct this: 2(a) replace the period with a comma, which turns the line into a subordinating clause that depends on the first half of the sentence; and 2(b) Replace the "although" with "however," which is a word that can mark an independent clause (a sentence).
Possible Corrections	The students who studied hard were pleased with their grades on the final exam. Note: Main subject: The students Main verb: were pleased	1. (a) Significant improvements in light environments were observed in artificially created gaps in the forest canopy**, thus** resulting in better growth performance of the light-demanding plants on the forest floor. 1. (b) Significant improvements in light environments were observed in artificially created gaps in the forest canopy**. This resulted** in better growth performance of the light-demanding plants on the forest floor.

		2. (a) In a study looking at two canopy gap sizes in central New Zealand, Forbes et al. (2016) found significantly higher natural regeneration of light-demanding plants than planted seedlings in gaps with at least 50% light transmission**, although** canopy gaps with 84% light transmission were more favorable for planted seedlings. 2. (b) In a study looking at two canopy gap sizes in central New Zealand, Forbes et al. (2016) found significantly higher natural regeneration of light-demanding plants than planted seedlings in gaps with at least 50% light transmission. **However,** canopy gaps with 84% light transmission were more favorable for planted seedlings.

Subject-Verb Agreement

	Simple Writing	**Scientific Writing**
Example	1. The **group** of students who studied hard **were** pleased with their grades on the final exam. 2. The **book**, with its 19 long chapters, **were** very hard to read.	3. The cluster of trees that survived the low-light environment long-term **were** more tolerant of shade than tōtara. 4. **Estimation** of percent light transmission from the hemispherical photos **were** accomplished using Gap Light Analyzer.
Explanations	**All verbs must agree with their subjects; singular subjects must have singular verbs and plural subjects must have plural verbs.** While this may sound simple, it is a common mistake. For example, it is tempting to apply plural verbs to collective nouns, such as group, class, or audience, which is the case in Example 1 above. Collective nouns are singular, even though they imply more than one person or thing. They must therefore take a singular verb ("the group was"). Similarly, when a noun is modified by extra "stuff,"	In the first scientific example, the noun "cluster" is singular, even though it implies multiple items; it is a collective noun and must have a singular verb. When the noun and verb are placed next to each other this becomes evident: "the cluster were…" In the second example, the noun "estimation" is separated from the verb by a long prepositional phrase that involves a plural noun (photos). This makes it easy to confuse the verb and subject. The simplest way to correct this is to say the verb and subject together out loud: Estimation were accomplished.

	such as prepositional phrases, or relative clauses, then it is easy to match the verb with the most recent noun. In example 2 above, the verb "were" applies to the noun "book"; it does not apply to the noun "chapters" from the modifying prepositional phrase "with its 19 long chapters." **Tip: one way to ensure your subjects and verbs agree is to say them out loud together: The group were; and the book were.** When you separate the subject and verb from the extra stuff in the sentence, then it is easier to recognize disagreement.	
Possible Corrections	1. (a) The **group** of students who studied hard **was** pleased with their grades on the final exam. 1. (b) The **students** who studied hard **were** pleased with their grades on the final exam. 2. (a) The **book**, with its 19 long chapters, **was** very hard to read. 2. (b) The 19 long **chapters** of the book **were** very hard to read.	1. The cluster of trees that survived the low-light environment long-term **was** more tolerant of shade than tōtara. 2. **Estimation** of percent light transmission from the hemispherical photos **was** accomplished using Gap Light Analyzer.

Comma Splices

	Simple Writing	**Scientific Writing**
Examples	1. The students did not study, they failed the exam. 2. The students did not study, they passed the exam.	At the forest edge, tree growth was highly variable, some seedlings grew as tall as or taller than trees in the canopy gap.

Explanations	**Comma splices occur when two otherwise complete sentences are put into one sentence, separated by a comma**. Most sentences have just one main subject and main verb. However, **if a sentence does have more than one subject and main verb—i.e. if two independent clauses (sentences) are crammed into one—then they must be separated by a coordinating conjunction**, such as and, but, for, nor, or, yet. These are added in corrections 1(a) and 2(a). Alternatively, one half of the comma splice can be subordinated to the other, with a subordinating conjunction, such as because, or even though. This often involve reversing the order of the two halves of the splice, as in correction 1(b) and 2(b). Another way to correct a comma splice is simply to replace the comma with a semicolon, as in correction 1(c), or with a period.	This is a comma splice because both halves of the sentence have a main subject and a main verb: "At the forest edge, tree growth was highly variable" and "Some seedlings grew as tall as or taller than trees in the canopy gap." This can be corrected in the same ways that the simple writing examples were corrected: A coordinating conjunction can be added after the comma (a); one half of the splice can be subordinated to the other (b); or the comma can be replaced with a semicolon (c) or period (d).
Possible Corrections	1. (a) The students did not study, **and** they failed the exam. 2. (a) The students did not study, **but** they passed the exam. 1. (b) The students failed the exam **because** they did not study. 2 (b) The students passed the exam **even though** they did not study. 1. (c) The students did not study**;** they failed the exam	(a) At the forest edge, tree growth was highly variable**, for** some seedlings grew as tall as or taller than trees in the canopy gap. (b) At the forest edge, tree growth was highly variable**, since** some seedlings grew as tall as or taller than trees in the canopy gap. (c) At the forest edge, tree growth was highly variable**;** some seedlings grew as tall as or taller than trees in the canopy gap. (d) At the forest edge, tree growth was highly variable**. S**ome seedlings grew as tall as or taller than trees in the canopy gap.

Run-On Sentences

	Simple Writing	**Scientific Writing**
Example	Even though I really wanted to, I couldn't study for the exam tonight, because a new show just came out on Netflix, which I must watch, because it's starring my favorite actor, who I loved in the Spiderman films, even though I usually hate Marvel comic movies, because I can't stand all the CGI and alien villains.	One example of competitive exclusions of early-successional species in regenerating forests is where low-light environments prevent the establishment of late-successional species, which, in some environments, can persist for many decades before changes in canopy structure allow light environments to increase and recruitment to occur, which gives rise to the need for gap-based interventions to create a more open stand structure in the restoration of many shade-intolerant late-successional species, including oak and pine, although there is concern about the intermittent effect of gaps on the restoration of shade-intolerant species as the process of gap closure could reduce plant growth over time and restrict seedling development into the canopy.
Explanations	**Run-on sentences occur when a sentence has too much extra "stuff," like subordinating clauses, prepositional phrases, and relative clauses.** In the example above, the "even though" and "because" clauses are subordinated to their preceding lines, and the "which" and "who" clauses are relative clauses that modify the preceding nouns. This extra "stuff" is normal and good in academic writing. However, when there is too much of it, the reader will lose the main core of the sentence, which is the main subject and verb. In this sentence, the main subject is I, and the main verb is study. Even though this sentence is grammatically correct, it reflects ineffective communication. The only way to correct run-on sentences is to break them up, by turning the subordinating clauses and relative clauses into complete sentences. This often involves	Much the like the simple writing example of a run-on sentence, this scientific example has too many subordinate clauses and relative clauses; prepositional phrases like "of early-successional species in regenerating forests" and "of many shade-intolerant late-successional species, including oak and pine," are often unavoidable in academic writing. The best way to fix run-on sentences such as these is to turn the subordinate clauses into independent clauses (complete sentences). This will involve specifying the main subject of the clause, such as "these low-light environments" below. Sometimes, if it is clear from the previous sentence, the demonstrative pronoun "this" can be used to add the main subject (the second sentence below). Another means of turning a subordinate clause into an independent clause is to swap subordinating conjunctions, such as "although," with words like "however," which can mark an independent clause (see below). Finally, it is also possible to connect two closely related independent clauses with a semicolon.

	adding a main subject. Sometimes it's good to separate two closely connected independent clauses (sentences) with a semicolon.	
Possible Corrections	I couldn't study for the exam tonight, even though I really wanted to**. The problem is**, a new show just came out on Netflix, which I must watch**;** it's starring my favorite actor. I loved her in the Spiderman films, even though I usually hate Marvel comic movies, because I can't stand all the CGI and alien villains.	One example of competitive exclusions of early-successional species in regenerating forests is where low-light environments prevent the establishment of late-successional species**. In some cases, these low-light environments** persist for many decades before changes in canopy structure allow light environments to increase and recruitment to occur**. This** gives rise to the need for gap-based interventions to create a more open stand structure in the restoration of many shade-intolerant late-successional species, including oak and pine**. However**, there is concern about the intermittent effect of gaps on the restoration of shade-intolerant species**;** the process of gap closure could reduce plant growth over time and restrict seedling development into the canopy.

Unclear Pronoun Antecedent

	Simple Writing	**Scientific Writing**
Example	1. The students worked hard on the assignments and the TAs worked hard grading. **They** were happy with what **they** accomplished. 2. **They** say the weather will be cold today.	1. Each replicate comprised 20 locally sourced, nursery-raised tōtara seedlings planted approximately 1m apart, in four rows of five seedlings. **They** were located within an altitudinal band of 100–200m a.s.l. but where possible keeping slope and aspect similar. 2. A common means of restoring abandoned farmland to forest is to facilitate natural regeneration. To do this, **they** remove degrading factors from the site, such as grazing animals.
Explanations	A pronoun is a word that stands in place of a noun/noun phrase. Pronouns are words such as he, she, it, they, them, this, these, and those (and more). **A pronoun is unclear when the noun to which is refers (called an antecedent) is not obviously identifiable in its context.**	In the first example, it is unclear what the "they" refers to: is it the replicates, the seedlings, or the rows? There is more than one way of making this sentence clear. The simplest way is to replace the pronoun with the actual noun it is replacing (1). In the second example, the pronoun is unclear because there are no contextual options: who are the ones removing the degrading factors? There are at least two ways of fixing this. One is to specify the identity of "they" (2a). Alternatively, it is possible to

	Antecedents are often unclear when the context allows for multiple options, as in the first example above. Here, it is unclear who either "they" refers to: Were the students happy with what they themselves did? Were the TAs happy with what the students accomplished? Were the TAs happy with their own grading efforts? Each pronoun could refer to either the students or the TAs, and the meaning of the sentence changes dramatically with each option. The best way to make the antecedents clear in this case is to use the specific nouns rather than the pronouns. In the second example, the pronoun is unclear because there are no contextual options for the antecedent; who are they? While such idiomatic expressions are common and acceptable in speech and simple writing, it is not acceptable in academic writing. **Pronoun antecedents must always be clear in academic writing.**	switch the verb from active to passive voice (2b). Because the passive voice turns the sentence's object to a subject, the identify of the removers can remain unspecified.
Possible Corrections	1. The students worked hard on the assignments and the TAs worked hard grading. **The TAs** were happy with what **the students** accomplished. 2. **The meteorologist** said that the weather will be cold today.	1. Each replicate comprised 20 locally sourced, nursery-raised tōtara seedlings planted approximately 1m apart, in four rows of five seedlings. All replicates were located within an altitudinal band of 100–200m a.s.l. but where possible keeping slope and aspect similar. 2. (a) A common means of restoring abandoned farmland to forest is to facilitate natural regeneration. To do this, **restoration managers** remove degrading factors from the site, such as grazing animals. 2 (b) A common means of restoring abandoned farmland to forest is to facilitate natural regeneration. To do this, the site's

		degrading factors, such as grazing animals, **must be removed**.

Unclear Pronoun Antecedent Continued: This

	Simple Writing	**Scientific Writing**
Example	I worked really hard and got good grades this term. I attended all lectures and tutorials, completed all assigned reading, took notes during class and while reading, and handed in all my assignments on time. **This** was very satisfying.	1. We observed higher growth rates of tōtara seedlings under canopy gaps compared with the control, ring-barked, or forest edge treatments. **This** remained significant after 4 and 6 years. 2. Arrested successions typically occur when the growth of one species excludes another because they compete for the same resources. When this happens, restoration managers may need to actively intervene to help direct the succession toward the desired goal. An example of **this** is where low-light environments in early-successional stands prevent establishment of late-successional species (Li & Ma 2003).
Explanations	**The word "this" is a unique pronoun because it can refer to entire sentences, paragraphs, whole articles, or even books**. **Because "this" is such a flexible pronoun, you must be careful to ensure that its antecedent is always clear.** It is very common and easy to leave these pronouns ambiguous. In the example above, there are multiple options for the word "this." What was it that was satisfying? Was it receiving the good grades, the hard work itself, each example of hard work, or was it the fact that all the hard work resulted in good grades? There are at least two ways to fix this problem. First (a) you can replace the pronoun with a noun/noun phrase that identifies all the elements of the previous sentence. Alternatively (b),	In the first example, because the preceding sentence is complex, with multiple elements, it is not obvious what the "this" refers to. While the only antecedent option that makes sense in the context is the growth rate (growth rate remained significant), there are a number of noun/noun phrases that confuse this: tōtara seedlings; canopy gaps; the control; and edge treatments. To make this sentence clear, it is simplest to treat the "this" as a (demonstrative) adjective, which modifies the noun/noun phrase antecedent (correction 1 below). In the second example. the topic sentence of a new paragraph has a "this" without any indication of what it refers to from the preceding paragraph(s). Such use of the word "this" is common in student writing. When using the word "this" in a topic sentence, always make sure its antecedent is clear. The simplest way of making the sentence clear is to add the specific antecedent to the demonstrative adjective, using language/words from the preceding paragraph.

	you can treat the pronoun as an adjective, which modifies a specifying noun phrase. This is what linguists call a demonstrative adjective. The latter option is very common in academic writing.	
Possible Corrections	a) I worked really hard and got good grades this term. I attended all lectures and tutorials, completed all assigned readings, took notes during class and while reading, and handed in all my assignments on time. **The fact that all my hard work paid off** was very satisfying. b) I worked really hard and got good grades this term. I attended all lectures and tutorials, completed all assigned reading, took notes during class and while reading, and handed in all my assignments on time. **This reward for my hard work** was very satisfying	1. We observed higher growth rates of tōtara seedlings under canopy gaps compared with the control, ring-barked, or forest edge treatments. This **higher growth rate of tōtara seedlings** remained significant after 4 and 6 years. 2. Arrested successions typically occur when the growth of one species excludes another because they compete for the same resources. When this happens, restoration managers may need to actively intervene to help direct the succession toward the desired goal. An example of **this competitive exclusion** is where low-light environments in early-successional stands prevent establishment of late-successional species (Li & Ma 2003).

Overuse of the Passive Voice

	Simple Writing	**Scientific Writing**
Examples	1. The textbook **was read** by the students. 2. Good grades **were received** by the students who worked hard.	1. The greatest variability in growth and lower seedling survival **was found** at the forest edge sites. 2. The highest light transmission **was provided by** artificial gaps from selective felling of kanuka. 3. In one study, **it was reported by** Ramos and del Amo (1992) that consistent growth improvement and highest survival of all planted seedlings in a canopy treatment with 37% light transmission.

Explanations	In sentences that use the passive voice, the subject of the sentence is the receiver of the action. In the example above, the textbook becomes the receiver of the action, rather than the object that is being acted upon by the students. **While it is acceptable and common to use the passive voice in academic writing, particularly in scientific writing, it can often make expression awkward and confusing for the reader.** It is important to be aware of when and how much you are using the passive voice. In both examples above, the expression of ideas is awkward because the main point of the sentences is to highlight the what the students did—to highlight their agency in academic success. In using the passive voice, the focus moves to the object/result of their efforts.	The first example above may be an acceptable expression. However, if it is part of a series of sentences that use the passive voice, it would better to switch it to the active voice, with a personal pronoun as the subject. In the second example, the passive voice draws attention away from the main point of the sentence: that artificial forest gaps (as opposed to other forest restoration methods) provided the most light transmission to the forest floor. It is therefore better to express this idea in the active voice and make gaps the subject and main actor in the sentence, and make the forest gaps the main actor in the sentence. In the third example, the passive voice adds unnecessary words to the sentence. In academic writing, it is best to try to keep your ideas simple and concise whenever possible. It is much simpler to say "they reported…" rather than "it was reported by them that…"
Active voice alternatives	1. The students **read** the textbook 2. The students who worked hard **received** good grades.	**1.** **We found** greatest variability in growth and lower seedling survival from the forest edge sites. **2.** Artificial gaps from selective felling of kanuka **provided** highest light transmission. **3.** In one study, Ramos and del Amo (1992) **reported** consistent growth improvement and highest survival of all planted seedlings in a canopy treatment with 37% light transmission.

Improper Tense Use

	Simple Writing	**Scientific Writing**
Example	The students who will study hard received good grades.	1. The results of this study **suggested** that gap creation **was** a productive tool for restoring late-successional canopy species in regenerating forests.

		2. The trial **<u>is</u>** established in October 2009 in a regenerating kanuka forest. **3.** Restoration of degraded lands **<u>was</u>** typically undertaken by facilitating natural regeneration.
Explanations	Academic writing requires very specific use of verb tenses. **It is important to be aware when you use verbs that describe actions that already happened (past tenses), actions that are current (present tenses), and actions that will or should happen (future tenses).** In the example above, the tenses in the two halves of the sentence are incompatible; if the students' studying is in the future, the result of that hard work should not be presented in the past (or present). To correct this, the tenses must align. In the second example, the tense in the second half of the sentence does not make sense for that action	The first example is typical sentence found in the discussion section of a scientific article. The verb "suggest" and "was" should not be rendered in the past tense because the implications of the study (that gap-creation is better than other forest-restoration methods) are present and ongoing. Therefore, many the verbs in the discussion section of a scientific article should be put in a form of the present tense. In the second example, the verb should be given in a past tense, because it describes a past completed action (what was done in the study). This is typical of sentences from the method and results sections of a scientific article. In the third example, the verb should be rendered in present tense, since it describes a presently used method of forest restoration. This is typical in the introduction of scientific articles, which describe current practices or current scholarship.
Possible Corrections		1. The results of this study **<u>suggest</u>** that gap creation **<u>is</u>** a productive tool for restoring late-successional canopy species in regenerating forests. 2. The trial **<u>was</u>** established in October 2009 in a regenerating kanuka forest. 3. Restoration of degraded lands **<u>is</u>** typically undertaken by facilitating natural regeneration.

Awkward Phrasing

	Simple Writing	**Scientific Writing**
Example	The **<u>students</u>**, because of the influence of their professor, who gave an inspiring speech on the importance of	1. **<u>Gap creation is likely to be</u>**, both through providing ideal sites for the growth of light-demanding species like tōtara and through natural establishment of other future canopy

	scientific inquiry, **were eager to work hard at the course**.	trees, **an important tool for restoring** late-successional canopy species in regenerating forests. 2. Similar to the effect of herbivory on tōtara seedlings planted into *Pinus* canopy gaps, **survival in the edge sites**, because of enhanced herbivory, most likely feral red deer which impacted some plants, **was lower**.
Explanations	**Awkward phrasing can happen in many ways. One of the most common is when the two of the main elements of a sentence—its subject object—are separated by other sentence elements**, such as result clauses and relative clauses. In the example above, the subject (students), verb (were), and objects (eager to work hard…) are separated by two extra clauses. The best way to make this sentence clearer is to put the subject, verb, and object together and the other sentence elements at the end.	In the first example above, the main subject (gap creation) and main verb (is) are together. However, the object (an important tool for restoring …) occurs at the end of the sentence, which interrupts the flow. The object should be kept close to the verb because it receives the action of the verb. The simplest correction is to keep the verbs, subject, and object together and put the other clauses at the end. In the second example, the subject (survival) and verb/object (was lower) are separated by two extra clauses. What is more, the subject does not come until halfway through the sentence, after another long comparative clause. The simplest way to ensure the sentence is clear is to put the subject, verb, and object together.
Possible Correction	The students were eager to work hard at the course, because of the influence of their professor, who gave an inspiring speech on the importance of scientific inquiry.	1. **Gap creation is likely to be an important tool for restoring** late-successional canopy species in regenerating forests, both through providing ideal sites for the growth of light-demanding species like tōtara and through natural establishment of other future canopy trees. 2. **Survival in the edge sites was lower** because of enhanced herbivory, most likely feral red deer, which impacted some plants, similar to the effect of herbivory on tōtara seedlings planted into *Pinus* canopy gaps.

Tone not Academic/too Colloquial

Example	If **you** want old farmland to **turn back into** a forest, then **the best way** is to cut down a **bunch** of trees that are there now to let more light in so that **some other trees have a chance to grow tall**. If **you just** plant new trees at the forest edge, or if **you just** slowly kill some of the tall trees by scraping off their bark, it **won't work as good**. **You** have to **punch a hole** in the forest that is there now.

Explanations	**<u>The tone of academic writing is very formal.</u>** There are many features of this tone that differentiate it from other forms of writing and everyday speech, and it takes time and practice to become proficient in this type of writing. There are a few guidelines that may help, however, which are demonstrate in the example above. First, academic communication does not use contractions (like won't) or second person pronouns (you). It also uses more objective language, such as optimal or more effective/productive, rather than good/bad, or better/best. Academic writing also avoids colloquial (everyday speech) language, such as "punch a hole" and "won't work as good."
Possible Corrections	Artificial gap-creation is the most effective means of restoring abandoned farmland to forest. These gaps provide the ideal sites for the growth of light-demanding species, which are otherwise excluded by the existing species. Other methods of forest-restoration, such as edge-planting and ring-barking, do not allow sufficient light transmission for the growth of these shade-intolerant species.

Endnotes

1. The examples from scientific writing in this comment bank were adapted from "Canopy manipulation as a tool for restoring mature forest conifers under an early-successional angiosperm canopy," by Adrian M. Tulod, David A. Norton, and Courteney Sealey, 2019, *Restoration Ecology* 27(1).

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