When should you revise? First, you need to be ready. Let’s put revisions into context with a summary of the writing process so far:

- Decide what to include – data, figures and tables
- Make an outline with section titles and topic sentences for each paragraph
- Fill in the details – create a draft
- Revise the draft.

Many people make the mistake of revising their work haphazardly: Read the document several times, catch as many mistakes as you can, and turn it in either when you get sick of it or when it is due. I would like to introduce a more systematic approach, one that you can use to revise your own work.

My approach to revisions is simple: work down from paper level, to section level, to paragraph level, to sentence level, and finally to word level.

- **Paper-level** revisions: Is everything there? Check the graduate student handbook. Did you use the right formatting? Do you have an abstract, table of contents, and all your references? Did you include all “four elements” as mentioned in the handbook? Does your paper satisfy its main purpose? In other words, does it read like a proposal? How many pages are you under or over the limit? (Do not cut or add yet.)
- **Section-level** revisions: Do each of your sections flow well? Do you use the same verb tense throughout the section? Are your points or arguments clear? Do you lead the reader through your logic step-by-step? Do you support each of your points or arguments? Cut weak or irrelevant points or add necessary detail at this stage to meet the page limit.
- **Paragraph-level** revisions: 1 paragraph = 1 point or idea. Does each paragraph have a topic sentence? Do your topic sentences tell a story? Do you make appropriate transitions from one paragraph to the next? (Check the page limit again, cut accordingly)
- **Sentence-level** revisions: Scan each sentence for the 5 Red Flags (below). Check the page limit for the last time, cut accordingly.

Proofread the 2nd draft

Proofread and spell-check (**word-level** revisions). This will be the topic of a separate tutorial.
Sentence-level Revisions: The 5 RED FLAGS

The 5 RED FLAGS | What to look for...
---|---
1. Nominalizations | passive tense and needless words
2. There are.../There is... | passive tense
3. Sentences starting with a modifying phrase | misplaced modifiers and dangling participles
4. The adverbs ONLY, OFTEN, and JUST | misplaced modifiers
5. Lists and comparisons | parallelism

RED FLAG #1: Nominalizations.

Nominalizations are nouns created from verbs and adjectives. If you learn how to recognize and get rid of them, you can easily produce text that is tight, clear and grammatically sound.

You can recognize nominalizations by their endings. Former verbs typically end in -tion, -ance, and -ment (for example, observe => observation, depend => dependence, and establish => establishment); whereas former adjectives typically end with -ence, -ness, and -ity (for example, intelligent => intelligence, worthless => worthlessness, and complex => complexity).

The kinetics of reductive dissolution of Fe(III) oxyhydroxide by ascorbate, cysteine and sulfide also strongly suggest a dependence of the rates of reductive dissolution on the solubility of different iron oxides. The kinetics of reductive dissolution of Fe(III) oxyhydroxide by ascorbate, cysteine and sulfide also strongly suggest the rates of reductive dissolution depend on the solubility of different iron oxides.

The observation that the range in $v_{max}$ is larger compared to the range of $K_{so}$ values is in general agreement with the findings of ABC and XYZ. The larger range in $v_{max}$ compared to the range of $K_{so}$ values generally agrees with the findings of ABC and XYZ.

We made the calculation of the noise from the follower and the detector to determine the rms voltage noise at the capacitance node. We calculated the noise from the follower and the detector to determine the rms voltage noise at the capacitance node.
Notice how nominalizations force you to use needless words and the passive tense to create the same picture as a single verb or adjective. See Appendix 1 for a list of *Needless Words and Phrases.*

**RED FLAG #2:** “There are...”, “There was...” can usually be deleted without changing the meaning of the sentence.

```
There are multiple H abstraction pathways that could occur in this reaction.
```

```
Multiple H abstraction pathways could occur in this reaction.
```

But the passive voice has its uses in scientific writing and is even necessary sometimes.

- To shift emphasis. “A gang of teenagers were arrested by police yesterday...”
- To soften your meaning. “The mice were injected with test substance A...” is preferred to “We injected the mice with test substance A...”
- To remove the actor. Either because the actor was unknown or not the focus of the sentence. “Soil samples were taken at discrete intervals along the northwest transect.”

Still, active sentences are almost always preferred to passive ones. Notice in the examples below how the verbs appear only at the end, making the sentence that much harder to understand.

```
In this paper a conceptual model for all possible pathways related to the cycling of arsenic in the sediments of Tantare Lake is developed.
```

```
In this paper, we present a conceptual model for all possible pathways related to the cycling of arsenic in the sediments of Tantare Lake.
```

```
Here the westernmost basin, hereafter called Basin A, which is acidic (pH 5.3–5.6), oligotrophic (Chl a 0.2–0.9 nM) and perennally oxic, will be considered.
```

```
We studied the westernmost basin, Basin A, which is acidic (pH 5.3–5.6), oligotrophic (Chl a 0.2–0.9 nM), and perennially oxic.
```

**RED FLAG #3: Sentences starting with a modifying phrase.** Opening modifying phrases often give rise to misplaced modifiers and dangling participles.

So, what is a modifying phrase? A modifying phrase is a string of words that acts like an adjective or an adverb.

The European Commission has launched an online tool *for companies and universities* seeking innovative partners.
The entire phrase “for companies and universities” acts as an adjective modifying the noun “online tool.”

There are three types of modifying phrases used in everyday written English: prepositional phrases, participle phrases, and infinitive phrases. Regardless of which type of modifying phrase you use, always place it as close as possible to the object it is modifying.

- **Prepositional phrases** start with a preposition (in, to, on, with, for, under, inside, outside, etc.) and comprise an object and a word or phrase describing or modifying that object. They act as adjectives and adverbs, meaning they can modify anything (nouns, verbs, adjectives, or other adverbs).

  I ate lunch *in the city*.  [adverb]

  I ate lunch at the most famous restaurant *in the city*.  [adjective]

In the first example, *in the city* modifies *ate*, as in where you ate your lunch. In the second sentence, however, *in the city* has been moved to behind *restaurant*, so it has become an adjective modifying the noun *restaurant*. While a new prepositional phrase, *at the most famous restaurant*, now modifies *ate* (again, where you ate your lunch: at a restaurant).

But here is where writers run into trouble: a participle phrase will modify whatever it is next to, sometimes creating sentences that sound a little ridiculous:

  They said it’s going to rain *on the radio*.  [Will the radio still work?]

  They said *on the radio* that it’s going to rain.

If a modifying phrase is placed too far away from its intended object, as in the case above, the phrase becomes a **misplaced modifier**.

- **Participle phrases** start with an –*ing*1 or an –*ed* verb, and comprise an object, and a word or phrase modifying that object. They act as adjectives ONLY, meaning they can modify only nouns or pronouns. This means that if a participle phrase appears at the beginning of the sentence, it must modify the grammatical subject of the sentence.

1–*ing* verbs also appear as gerunds, which act as nouns. Gerunds can be used alone or made into a gerund phrase. They do not cause nearly as much trouble as participle phrases, as they do not modify anything. **Running** is my favorite sport. **Writing this chapter** was difficult.
Just like prepositional phrases, participle phrases can be also be misplaced:

Lying on top of the intestine, you can perhaps make out a fine thread lying on top of the intestine.

You are not lying on top of the intestine, the thread is!

But if the object does not appear in the sentence at all, the phrase turns into the dreaded **dangling participle**.

Having eaten my dinner, the waitress brought out the dessert tray.

After I finished eating my dinner, the waitress brought out the dessert tray.

In the left-hand example, it sounds like the waitress actually ate your dinner. The intended object, I, is missing entirely from the sentence.

A participle phrase at the beginning of a passive sentence is also apt to be a dangler. Because a passive sentence does not have grammatical subject by definition, the participle phrase automatically dangles.

On finding the door unlocked, it was opened carefully.

On finding the door unlocked, Bill opened it cautiously.

- **Infinitive phrases** start with an infinitive verb (to + ...) and comprise an object and a word or phrase modifying that object. Infinitive phrases can function as adjectives, adverbs, or even nouns.

  Bob hopes to win the approval of his teacher. [noun, object of the verb hopes]

  The best way to reach him is by telephone. [adjective, modifies way]

  We used this method to better understand storm events. [adverb, modifies used, as it describes why the method was used]

Of course, infinitive phrases can also be misplaced or left to dangle.

To initiate the procedure, the START button should be pushed.

To initiate the procedure, push the START button.

In the first sentence, it sounds like the button initiates the procedure, when actually “you” are being directed to “push” the button.
NOTE: Many misplaced modifiers and dangling participles involve phrases at positioned at the beginning of the sentence!

Check that modifying phrases are actually modifying something. A noun? The verb? Always transpose the modifying phrase to where it should be, that is, just after the object. THEN ask yourself if you can move the phrase to the front position.

When comparing abiotic against enzymatic Fe(III) oxyhydroxyde reduction, although the electron sources are different, both reduction reactions involve a direct ET reaction to Fe(III) centers at the Fe(III) oxyhydroxyde surface.

Although the electron sources are different when comparing abiotic against enzymatic Fe(III) oxyhydroxyde reduction, both reduction reactions involve a direct ET reaction to Fe(III) centers at the Fe(III) oxyhydroxyde surface.

For example, for the Fe(III) solids used in this study, we found a positive correlation.

For example, we found a positive correlation for the Fe(III) solids used in this study.

Of course, there are instances when you want to move the modifying phrase out of the way, either to the beginning or the end of the sentence. For example, when you do not want to interrupt your main clause.

Pedersen et al (2005) showed, using different Fe isotopes, that the Fe(II) detachment kinetics from the Fe(III) oxyhydroxyde surface is decreasing.

Using different Fe isotopes, Pedersen et al (2005) showed that the Fe(II) detachment kinetics from the Fe(III) oxyhydroxyde surface is decreasing.

The neglecting of the longwave (or infrared) component fails in certain cases to account for the significant modification of thermal radiation by such forcing agents as mineral dust.

In certain cases, neglecting the longwave (or infrared) component fails to account for the significant modification of thermal radiation by forcing agents such as mineral dust.

A fully transient simulation of the seasonal variations in sediment biogeochemistry would have required an accurate constraint, on a short time-scale, of the temporal evolution of the boundary conditions at the sediment--water interface.

A fully transient simulation of the seasonal variations in sediment biogeochemistry would have required an accurate constraint of the temporal evolution of the boundary conditions at the sediment--water interface on a short time-scale.
RED FLAG #4: The adverbs ONLY, OFTEN and JUST

Just like prepositional phrases, these words modify whatever word in the sentence they are next to.

Unfortunately, this also means that adverbs like ONLY, OFTEN, and JUST can become misplaced modifiers too.

This example from Scientific English (Day, 1995) illustrates my point perfectly.

Only I hit him in the eye yesterday.
I only hit him in the eye yesterday.
I hit only him in the eye yesterday.
I hit him only in the eye yesterday.
I hit him in only the eye yesterday.
I hit him in the only eye yesterday.
I hit him in the eye only yesterday.

RED FLAG #5: Lists and comparisons

Use parallel construction in series and lists. In other words, every item in the list should start with same type of word and use the same construction.

My degree, my work experience, and ability to complete complicated projects qualify me for the job.
My degree, my work experience, and my ability to complete complicated projects qualify me for the job.

Always use a parallel construction in phrases and clauses separated by a coordinating conjunction (and, but, or, nor, yet, for, and sometimes so)

The product was washed either with alcohol or acetone.
The product was washed either with alcohol or with acetone.

Compound A was prepared analogously and by Lee’s method.
Compound A was prepared in an analogous manner and by Lee’s method.
Parallelism also applies to comparisons. Always compare apples with apples and oranges with oranges. And if the sentence opens with a comparison, it should refer to the subject of the sentence.

In contrast to the bromide anion, there is strong distortion of the free fluoride on the vibrational spectroscopy time scale. In contrast to the bromide anion, the free fluoride anion is strongly distorted on the vibrational spectroscopy time scale.

To Summarize...

1. OMIT NEEDLESS WORDS AND PHRASES

2. USE THE PASSIVE WITH A PURPOSE IN MIND. OTHERWISE, USE THE ACTIVE VOICE.

3. ALWAYS PLACE A MODIFYING WORD OR PHRASE AS CLOSE AS POSSIBLE TO THE OBJECT IT IS MODIFYING.

4. ALWAYS USE PARALLEL CONSTRUCTION WHEN WRITING SERIES, LISTS AND COMPARISONS.
Appendix 1: Needless Words and Phrases

Notice how frequently nominalizations appear in these phrases, along with THAT, IT, FACT, and IS/ARE/WAS/WERE.

Quoted from the *ACS Style Guide: A Manual for Authors and Editors, 2nd Edition*.

**Omit phrases such as**

As already stated
It has been found that
It has long been known that
It is interesting to note that
It is worth mentioning at this point
It may be said that
It was demonstrated that

**Omit excess words**

<table>
<thead>
<tr>
<th><em>Instead of</em></th>
<th><em>Use</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>It is a procedure that is often used.</td>
<td>This procedure is often used.</td>
</tr>
<tr>
<td>There are seven steps that</td>
<td>Seven steps must be completed.</td>
</tr>
<tr>
<td>must be completed.</td>
<td></td>
</tr>
<tr>
<td>This is a problem that is...</td>
<td>This problem is...</td>
</tr>
<tr>
<td>These results are preliminary in nature.</td>
<td>These results are preliminary.</td>
</tr>
</tbody>
</table>

**Use single words instead of phrases**

<table>
<thead>
<tr>
<th><em>Instead of</em></th>
<th><em>Use</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>a number of</td>
<td>many, several</td>
</tr>
<tr>
<td>a small number of</td>
<td>a few</td>
</tr>
<tr>
<td>are in agreement</td>
<td>agree</td>
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<tr>
<td>are found to be</td>
<td>are</td>
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<tr>
<td>are known to be</td>
<td>are</td>
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<tr>
<td>at present</td>
<td>now</td>
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<tr>
<td>at the present time</td>
<td>now</td>
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<tr>
<td>based on the fact that</td>
<td>because</td>
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<tr>
<td>by means of</td>
<td>by</td>
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<td>despite the fact that</td>
<td>although</td>
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<tr>
<td>due to the fact that</td>
<td>because</td>
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<td>during that time</td>
<td>while</td>
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<tr>
<td><strong>Instead of</strong></td>
<td><strong>Use</strong></td>
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<td>----------------</td>
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<tr>
<td>fewer in number</td>
<td>fewer</td>
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<tr>
<td>for the reason that</td>
<td>because</td>
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<tr>
<td>has been shown to be</td>
<td>is</td>
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<tr>
<td>if it is assumed that</td>
<td>is</td>
</tr>
<tr>
<td>in color, e.g., red in color</td>
<td><em>just state the color</em>, e.g., red</td>
</tr>
<tr>
<td>in consequence of this fact</td>
<td>therefore, consequently</td>
</tr>
<tr>
<td>in length</td>
<td>long</td>
</tr>
<tr>
<td>in order to</td>
<td>to</td>
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<tr>
<td>in shape, e.g., round in shape</td>
<td><em>just state the shape</em>, e.g., round</td>
</tr>
<tr>
<td>in size, e.g., small in size</td>
<td><em>just state the size</em>, e.g., small</td>
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<tr>
<td>in spite of the fact that</td>
<td>although</td>
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<tr>
<td>in the case of ...</td>
<td>in..., for...</td>
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<tr>
<td>in the near future</td>
<td>soon</td>
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<tr>
<td>in view of the fact that</td>
<td>because</td>
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<tr>
<td>is known to be</td>
<td>is</td>
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<tr>
<td>is dependent on</td>
<td>depends on</td>
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<tr>
<td>it appears that</td>
<td>apparently</td>
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<td>it is clear that</td>
<td>clearly</td>
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<tr>
<td>it is likely that</td>
<td>likely</td>
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<tr>
<td>it is possible that</td>
<td>possibly</td>
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<tr>
<td>it would appear that</td>
<td>apparently</td>
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<tr>
<td>of great importance</td>
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<tr>
<td>owing to the fact that</td>
<td>because</td>
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<tr>
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<tr>
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<td>after</td>
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