

LESSON 1. WRITING CLEARLY

If you asked me to describe what I did for lunch today, I might write the following:

- (1a) After returning from the gym, I had my usual lunch: a sandwich, an apple, and a Diet Coke.

Alternatively, I might describe lunch like this:

- (1b) After a return from the site of physical activity, consumption of a sandwich, an apple, and a Diet Coke was accomplished by me.

Had I actually written sentence 1b you probably would have thought me pompous, pretentious, or just plain strange. Yet when they move from writing about lunch to writing about research, too often writers assume they should abandon the straightforward style of sentence 1a in favor of the stilted text of sentence 1b.

Consider this pair of sentences:

- (2a) The demonstration of contextual influence on visual perception is the primary contribution of this report.
- (2b) Our primary finding is that context influences how people perceive visual stimuli.

Sentence 2a is the sort of sentence that's common in reports published in psychological journals, but sentence 2b expresses the same idea in language that's more direct and easier to understand.

Similarly, compare sentences 3a and 3b.

- (3a) Overestimation of negative reactions to unpleasant outcomes is common because of underestimation of adjustment to those outcomes.
- (3b) People often overestimate how negatively they will respond to unpleasant outcomes because they underestimate their ability to adjust to those outcomes.

The idea that's obscure in sentence 3a is crystal clear in sentence 3b.

In this lesson we'll see how to write sentences like 1a, 2b, and 3b, which are clear, concrete, and direct, and how to avoid sentences like 1b, 2a, and 3a, which are vague, abstract, and obscure. We'll start by looking at a primary symptom of obscure writing and then consider strategies for writing clearly.

What Makes Some Writing Hard to Read?

Sentences 1b, 2a, and 3a represent a kind of writing that’s often known as *bureaucratese* or *academese*, depending on the author’s profession. The hallmark of such writing is the frequent presence of nominalizations, nouns derived from verbs or adjectives. Nominalizations often end in *-tion*, *-ment*, *-ence*, and *-ness*. For example, *organization*, *recruitment*, *prominence*, and *brightness* are nominalizations derived from verbs (*organize*, *recruit*) and adjectives (*prominent*, *bright*). Other nominalizations found frequently in psychological writing are shown in Table 1.1.

Table 1.1 Common Nominalizations

<i>Verb</i>	<i>Nominalization</i>	<i>Adjective</i>	<i>Nominalization</i>
expect	expectation	precise	precision
perform	performance	clear	clarity
evaluate	evaluation	significant	significance
integrate	integration	different	difference

Nominalizations make writing seem obscure because they take the concrete action of a verb or the descriptive power of an adjective and bury it in a noun. Nominalizations are particularly harmful when they appear as the subject of a sentence, coupled with a weak verb, such as *is*, *are*, *seems*, or *has*. Sentence 3a illustrates this pattern: “Overestimation . . . is . . .”

Exercise 1.1

Identify the nominalizations in sentences 1b, 2a, and 3a.

A key to clear writing is recognizing nominalizations and, when possible, returning them to their original state as a verb or adjective. In fact, eliminating unnecessary nominalizations may be the single most important step in making your writing more direct and clear.

Strategies for Writing Clear, Direct Sentences

Avoiding nominalizations is good advice but not particularly satisfying because it says “what not to do” instead of “what to do.” Let’s return to

sentences 1a and 1b (page 1). Sentence 1b is difficult because of the nominalizations, but it's not the mere absence of nominalizations that makes sentence 1a so easy to understand. Instead, sentence 1a is clear because it's a one-sentence story about a person (me) and his actions (eating lunch). As stories go, it's not much; Steven Spielberg isn't about to call for the movie rights. But it's a story nonetheless, and like much better stories by J. K. Rowling, John Grisham, and Nicholas Sparks, it's readable because it focuses on a character acting.

Storytelling may seem far removed from scientific writing, but scientific writing typically has a tale to tell. Sentence 4a is written in academese:

- (4a) The belief of in-groups is that out-group members are less intelligent and less attractive.

It has a nominalization in its subject (*belief*) that's linked to a weak verb (*is*). But there's a story lurking underneath, one about in-groups and what they believe. Consequently, if we revise the sentence so that the character is in the subject and the action is in the verb, we get something that's much clearer:

- (4b) In-groups believe that out-group members are less intelligent and less attractive.

Sentences 5a and 5b show the same pattern:

- (5a) Susceptibility to the vanishing-ball illusion seems greater in individuals with ASD.
 (5b) Individuals with ASD are more susceptible to the vanishing-ball illusion.

Sentence 5b is easier to read because it puts the character in the subject and changes the nominalization to an adjective (susceptibility susceptible).

Exercise 1.2

Identify the characters and actions in the following sentences and then revise them with characters as subjects and actions as verbs.

1. Extraction of the gist of a scene is accomplished in a fraction of a second.
2. Counterfactual reasoning was the focus of our research.
3. Disclosure of personal information to friends is less common among East Asians than among Westerners.

4 Scientific Writing for Psychology

The examples we've seen so far involve simple sentences that include little more than a subject, verb, and object. But the same principles follow when we move to more complex sentences that include, for example, dependent clauses like the one in sentence 6a:

- (6a) Although skepticism of people who have been misleading previously is common in older children, trust in others is more frequent in preschool children.

Sentence 6a begins with a long dependent clause about older children and then moves to the independent clause about preschool children. The clauses have the same structure: a noun phrase built around a nominalization that's linked to a weak verb: *skepticism of people . . . is* and *trust in others is*. We can make the sentence more active (and clearer) by revising to eliminate the nominalizations, replacing *skepticism* with *skeptical* and *trust* (as a noun) with *trust* (as a verb):

- (6b) Although older children are skeptical of people who have misled them previously, preschool children generally trust others.

Sentence 7a is even more complex:

- (7a) Given this inability to identify the long-term benefits of a positive family life, the present longitudinal investigation was conducted.

In this case, the introductory dependent clause has two nominalizations (*inability*, *benefits*), and the independent clause has one (*investigation*). By replacing them with verbs and adjectives, and adding characters for the verbs, the sentence becomes clearer.

- (7b) Because past research has been unable to determine whether a positive family life is beneficial in the long term, we investigated this issue longitudinally.

When you run into sentences that are even longer and more complex grammatically, the same approach works: find nominalizations, replace them with verbs or adjectives, and add characters to the verbs. That said, although sentences 6b and 7b may be improvements over sentences 6a and 7a, they're far from being straightforward. In the next section we'll look at strategies for writing long sentences clearly.

Exercise 1.3

Replace the nominalizations in the following sentences with verbs or adjectives; add characters as necessary.

1. Interactions with natural elements lead to replenishment of directed-attention processes.
2. Feelings of cleanliness reduce judgments of the severity of others' moral transgressions.
3. A consonantal advantage for accuracy is well established in lexical processing.

Writing Long Sentences Clearly

Good storytelling focuses on characters and their actions: Good sentences get to characters quickly and link those characters strongly with their actions. To translate this principle into a tool for revising, remember that characters are typically introduced in the subject of a sentence; their actions are captured in the verb (and the objects of that verb). This leads directly to one rule of thumb: Effective sentences get to the subject quickly; they do not begin with long introductory clauses that force the reader to wonder what a sentence is all about. Such clauses make sentences 6b and 7b hard to understand. In 6b, for example, the story is about preschool children's beliefs, yet the reader must plow through a long clause about older children's beliefs. Similarly, in sentence 7b the story line is about the author's longitudinal study, but this surfaces only after a lengthy critique of the state of the literature.

If an introductory clause has more than five or six words, make it shorter. For example, the introductory clause in 6c has only three words, down from 12 in 6b.

- (6c) Unlike older children, preschool children generally trust people who have misled them previously.

Another strategy is to eliminate the introductory clause completely, by moving it to the end of the sentence:

- (7c) We investigated this issue longitudinally because past research has been unable to determine whether a positive family life is beneficial in the long term.

Exercise 1.4

Revise these sentences to eliminate the long introductory clause.

1. Because bilingual children have extensive experience selecting one language for production and inhibiting another, their cognitive control surpasses that of monolingual children.
2. Although both white and black individuals experience anxiety during interracial interactions, people can detect such anxiety only in members of their own race.
3. Given findings that prior experience helps infants segment words and that experiences associating objects and shapes help infants know that similarly shaped objects have the same name, we investigated the impact of experience on infants' mastery of syntax.

A second rule of thumb is to move directly from subject to verb to object; unnecessary words inserted between the subject and verb or between verb and object weaken the links between the key elements in the story line. Sentence 8a demonstrates this problem:

- (8a) Some adults, due to attachment anxiety, are skeptical that spouses will support them in times of need.

The story is about adults who doubt that spouses will support them. The character, *adults*, is the subject of the sentence, and the action, *are skeptical*, is the verb phrase. But inserting *due to attachment anxiety* between subject and verb muddies the waters. First, it separates the character from the action. Second, it mixes the phenomenon itself (adults question their spouses' support) with its cause (some adults are anxiously attached). Fortunately, fixing this one is easy:

- (8b) Due to attachment anxiety, some adults are skeptical that spouses will support them in times of need.

Due to attachment anxiety works fine as an introductory clause because it's only four words long. And removing it from the independent clause strengthens the link between the subject and verb.

Phrases inserted between verbs and objects are just as disruptive:

- (9a) Experiencing power enhances, across diverse cultures, people's satisfaction with their friendships, romantic relationships, and jobs.

The story line about the impact of power on life satisfaction is interrupted by a phrase, *across diverse cultures*, that deals with generality of the phenomenon. Here, too, moving the phrase to the beginning of the sentence solves the problem:

- (9b) Across diverse cultures, experiencing power enhances people's satisfaction with their friendships, romantic relationships, and jobs.

Exercise 1.5

Identify and relocate the disruptive text.

1. The size and orientation of an object affect, via pathways in visual and motor cortex, how people grasp it.
2. Unconscious thinking, for a range of problems, leads to better solutions.
3. People are quite skilled, despite remembering exact pitch inaccurately, at remembering patterns of changes in pitches.

Sometimes long sentences aren't clear because they sprawl. Despite a solid core in which subject, verb, and object are linked well, the sentence goes on and on. One clause is piled on top of another, almost as if the author kept adding new thoughts while writing. Sentence 10a illustrates sprawl:

- (10a) People describe recent events concretely but distant events abstractly, which is analogous to the description given near and far objects, although individuals with depression are prone to abstract descriptions regardless of spatial or temporal distance.

The sentence starts fine, with a story about how people describe recent and distant events differently. But then it bogs down: One clause describes similarities between descriptions of time and space and another describes how descriptions differ when people are depressed.¹

The first step in eliminating sentence sprawl is to remember the story line and drop text that doesn't contribute. In sentence 10a, unless the work is

¹By analogy, we can be grateful that the story of the three little pigs wasn't written like this: "The third little pig built a house of bricks, which he bought at the local home improvement center, although he could have paid less for the bricks online."

8 Scientific Writing for Psychology

going to focus on the link between descriptions and depression, that clause could be deleted:

- (10b) People describe recent events concretely but distant events abstractly, which is analogous to the description given near and far objects.

Sentence 10b is better but can be improved further. To see how, we need to explore some details of grammar. First, the clause beginning with *which* is a nonrestrictive or nondefining clause. It's not essential to the meaning of the sentence; 10b would be a complete sentence if it ended with *abstractly*. Instead, the nonrestrictive clause adds useful but not essential information. By contrast, in "The description that came first was concrete" *that came first* is a restrictive (defining) clause because it tells the reader which description was concrete (i.e., the one that came first).

Second, nonrestrictive clauses usually begin with *which*. This is a relative pronoun and, like any pronoun, needs an antecedent. In sentences such as 10b, the antecedent is often ambiguous. *Which* could refer to any of the words or phrases in the main clause (except *People*) or to the entire clause. Readers must figure this out for themselves, a process that delays their comprehension momentarily.

More often than not, *which* is a flag that a sentence is ending with a nonrestrictive clause that may sprawl. A trick for handling such sentences is to replace *which* with a word or phrase that provides a stronger connection between the sentence's main clause and the nonrestrictive clause.

- (11a) Some hints about the impact of emotion on perception come from research on the attentional-blink paradigm, which shows that people identify emotionally significant words faster than neutral words.

In this sentence, the clause beginning with *which* is nonrestrictive (the sentence would be meaningful if it ended with *paradigm*), and you need to read that entire clause to know that the antecedent of *which* is *research*. We can replace *which* with a resumptive modifier, a key noun from the main clause. Because the nonrestrictive clause refers to *research*, that's a good choice to replace *which*:

- (11b) Some hints about the impact of emotion on perception come from research on the attentional-blink paradigm, research showing that people identify emotionally significant words faster than neutral words.

In 11b, the clause leads with *research*, so the reader avoids the ambiguity of *which*. In other words, the repeated noun (*research*) anchors the clause, telling readers where they're headed. In the process, it avoids a sprawling sentence that seems to have no direction.

Sentences 12a and 12b illustrate the shortcomings of introducing a clause with *which* and the benefits of a resumptive modifier.

- (12a) Most prior studies of developmental change in processing speed have relied on samples of children living in the United States and Europe, which may bias conclusions about the shape of developmental functions.
- (12b) Most prior studies of developmental change in processing speed have relied on samples of children living in the United States and Europe, samples that may bias conclusions about the shape of developmental functions.

In 12b, I replaced *which* with *samples*. With this change, the reader immediately knows the topic of the nonrestrictive clause and the sentence no longer sprawls.

Sometimes the topic of the nonrestrictive clause is such that no single word from the main clause can be used to replace *which*. In this case, we use a word or phrase to summarize the relevant part of the main clause.

- (13a) Women who expect to encounter sexism are particularly attentive to words that are demeaning to females, which supports claims made by Allport (1954) more than 50 years ago.

In 13a, the nonrestrictive clause refers to the result that's described in the main clause; no noun from that clause can substitute for *which*. Instead, we can summarize that main clause by referring to it as *a result*, *a finding*, *an outcome*, or something similar:

- (13b) Women who expect to encounter sexism are particularly attentive to words that are demeaning to females, a finding that supports claims made by Allport (1954) more than 50 years ago.

Summative modifiers like this one function just as resumptive modifiers do: They replace a vague pronoun with a specific noun or noun phrase. In the process, summative modifiers reenergize a sentence, giving it direction.

10 Scientific Writing for Psychology

Sentences 14a and 14b provide another example:

- (14a) When people feel grateful to another person, they are more likely to reciprocate a favor, which tends to strengthen interpersonal relationships.

In this case, *which* refers to reciprocating a favor; *a behavior* or *an action* could be inserted instead:

- (14b) When people feel grateful to another person, they are more likely to reciprocate a favor, a behavior that tends to strengthen interpersonal relationships.

Exercise 1.6

Use resumptive or summative modifiers to deal with sentence sprawl.

1. Male infants are more likely than female infants to recognize a familiar stimulus in a novel orientation, which is consistent with research showing that males excel at spatial tasks.
2. We tested participants on counting span, operation span, and reading span tasks, which are used to estimate working memory capacity.
3. Compared with high school students of the 1970s, today's high school students believe themselves to be more intelligent, which is further evidence for a trend of greater self-esteem in today's high school students.

Sentence sprawl can't be blamed entirely on nonrestrictive clauses that begin with *which*. Sometimes sentences sprawl when authors make comparisons or include lists. Sentence 15a illustrates sprawl from a comparison:

- (15a) Studies with this paradigm typically find that people view members of their own group as friendly and kind but that out-group members are perceived to be hostile.

Sentence 16a shows sprawl from a list:

- (16a) Motor vehicle accidents are a leading cause of deaths among adolescents because adolescents often exceed speed limits, driving is

often done in conjunction with drinking alcohol, and seat belts are used rarely.

A good way to reduce the kind of sprawl seen in sentences 15a and 16a is by creating parallel structure—by expressing all the elements in the sentence in the same way, using the same grammatical forms. In sentence 15a, for example, the comparisons are completely inconsistent:

- one comparison involves active voice (*people . . . view members of their own group*) and another involves passive voice (*out-group members are perceived*);
- one comparison describes the target group completely (*members of their own group*), but the other uses a shorthand (*out-group members*); and
- one comparison mentions two traits (*friendly, kind*), but the other mentions only one (*hostile*).

By coordinating all of these comparisons—expressing them in the same terms—we get a sentence that isn't much shorter than 15a but avoids its sprawl:

- (15b) Studies with this paradigm typically find that people view in-group members as friendly and kind but that they perceive out-group members as hostile and stingy.

Sentence 15b is easier to read because the comparisons are expressed using parallel structure: the voice is active, the groups are described with shorthand, and the number of traits is the same.

We could shorten it further by deleting *that they perceive*:

- (15c) Studies with this paradigm typically find that people view in-group members as friendly and kind but out-group members as hostile and stingy.

And if you were really pressed for space, why not just use one trait per group?

- (15d) Studies with this paradigm typically find that people view in-group members as friendly but out-group members as hostile.

We can use parallel structure to make sentence 16a flow better and be more concise. The trick with this sentence is to recast all of the properties

12 Scientific Writing for Psychology

(speeding, drinking, not wearing seatbelts) in terms of how teenagers drive:

- (16b) Motor vehicle accidents are a leading cause of deaths among adolescents because adolescents often drive too fast, while drunk, and without wearing seatbelts.

Sometimes sprawl resists all of the techniques I've mentioned in the past few pages. In that case, there's no shame in splitting the long, sprawling sentence into two shorter, crisper sentences.

- (17a) Risk-taking behavior is often thought to be a stable, pervasive personality trait, but recent research suggests that it is specific to particular domains, such as sports, gambling, or investment, which explains why sky divers and bungee jumpers do not frequent casinos or play the stock market.

A summative modifier—replacing *which* with *a result that*—cuts the sprawl some but still leaves a mouthful:

- (17b) Risk-taking behavior is often thought to be a stable, pervasive personality trait, but recent research suggests that it is specific to particular domains, such as sports, gambling, or investment, a result that explains why sky divers and bungee jumpers do not frequent casinos or play the stock market.

It's time to bite the bullet and split the sentence in two:

- (17c) Risk-taking behavior is often thought to be a stable, pervasive personality trait, but recent research suggests that it is specific to particular domains, such as sports, gambling, or investment. This result explains why sky divers and bungee jumpers do not frequent casinos or play the stock market.

When you split a sentence in this manner, consider using a semicolon to separate it, like this:

- (17d) Risk-taking behavior is often thought to be a stable, pervasive personality trait, but recent research suggests that it is specific to particular domains, such as sports, gambling, or investment; this result explains why sky divers and bungee jumpers do not frequent casinos or play the stock market.

This is a subtle cue to the reader that the two independent clauses form a unit.

Exercise 1.7

Reduce the sprawl in these sentences by rewriting in parallel structure or as two sentences.

1. Among PhD-level scientists, those with greater SAT scores have more publications in scientific journals, and SAT score is positively correlated with the number of patents awarded.
2. For individuals who have approach goals in relationships, the number of positive features in the relationship predicts satisfaction with the relationship; when people have avoidance goals, relationship satisfaction is correlated with the absence of negative features in the relationship.
3. Research on the psychological correlates of human longevity shows that people with greater IQ scores tend to live longer, that greater conscientiousness is associated positively with longevity, and that the correlation between frequency of illness in childhood and age at death is negative.

WRAP UP

1. Eliminate nominalizations by revising sentences to put characters in the subject and actions in the verb.
2. Get to the subject quickly (avoid long introductory clauses) and don't interrupt the flow of subject-verb-object.
3. Avoid sentence sprawl by using resumptive and summative modifiers to begin nonrestrictive clauses and by describing comparisons and lists in parallel.

FOR PRACTICE

1. Search an article for nominalizations; replace the ones that you find.
2. Search for long introductory clauses; shorten or eliminate them.
3. Go on a “*which* hunt”—when you find one that's used to start a nonrestrictive clause, rewrite with a resumptive or summative modifier.

ANSWERS TO EXERCISES

Exercise 1.1

- (1b) After a *return* from the site of physical activity, consumption of a sandwich, an apple, and a Diet Coke was accomplished by me.

14 Scientific Writing for Psychology

- (2a) The *demonstration* of contextual *influence* on visual *perception* is the primary *contribution* of this *report*.
- (3a) *Overestimation* of negative *reactions* to unpleasant outcomes is common because of *underestimation* of *adjustment* to those outcomes.

Exercise 1.2

- 1. character = people; action = extracting the gist of a scene
People extract the gist of a scene in a fraction of a second.²
- 2. character = our research; action = focus
Our research focused on counterfactual reasoning.
- 3. character = East Asians and Westerners; action = disclosing personal information
East Asians disclose personal information to friends less often than Westerners do.

Exercise 1.3

- 1. Interacting with nature replenishes directed-attention processes. OR
When people interact with nature, their directed-attention processes are replenished.
- 2. When people feel clean, they judge others' moral transgressions less severely. OR
People who feel clean judge others' moral transgressions less severely.
- 3. When processing lexical information, people are more accurate on consonants than vowels. OR
People process consonants in lexical information more accurately than they process the vowels.

²The sentences I include as answers (here and throughout the book) are designed to illustrate possible answers. Please don't consider your answer "wrong" if it doesn't match mine word for word. Your sentence may be better than mine!

Exercise 1.4

1. Bilingual children have greater cognitive control than monolingual children because bilingual children have extensive experience selecting one language for production and inhibiting another. OR

Compared with monolingual children, bilingual children have greater cognitive control because they have extensive experience selecting one language for production and inhibiting another.

2. During interracial interactions, white and black individuals experience anxiety but detect it only in members of their own race. OR

Black and white individuals experience anxiety during interracial interactions but detect such anxiety only in members of their own race.

3. Given that experience helps infants learn words, we investigated the impact of experience on infants' mastery of syntax. OR

We investigated the impact of experience on infants' mastery of syntax because prior work shows that experience helps infants segment words and associate names and shapes.

Exercise 1.5

1. Via pathways in visual and motor cortex, the size and orientation of an object affect how people grasp it. OR

Pathways in visual and motor cortex convey information about the size and orientation of an object that affects how people grasp the object.

2. For a range of problems, unconscious thinking leads to better solutions. OR

Unconscious thinking leads to better solutions for a range of problems.

3. Although people remember exact pitch inaccurately, they are quite skilled at remembering patterns of changes in pitches. OR

People forget pitches, but they remember patterns of changes in pitches.

16 Scientific Writing for Psychology

Exercise 1.6

1. Male infants are more likely than female infants to recognize a familiar stimulus in a novel orientation, a result consistent with research showing that males excel at spatial tasks. OR
... novel orientation, a finding consistent with research showing ...
2. We tested participants on counting span, operation span, and reading span tasks, tasks used to estimate working memory capacity. OR
... reading span tasks, measures used to estimate ...
3. Compared with high school students of the 1970s, today's high school students believe themselves to be more intelligent, an outcome that represents further evidence for a trend of greater self-esteem in today's high school students. OR
... more intelligent, an observation that represents ...

Exercise 1.7

1. Among PhD-level scientists, those with greater SAT scores have more publications in scientific journals and more patents. OR
Among PhD-level scientists, greater SAT scores are correlated positively with more publications in scientific journals and more patents.
2. For individuals who have approach goals in relationships, the number of positive features in the relationship predicts satisfaction with the relationship; for individuals who have avoidance goals, the absence of negative features in the relationship predicts satisfaction. OR
Relationship satisfaction is predicted by the number of positive features in the relationship for people who have approach goals but by the absence of negative features for people who have avoidance goals.
3. Research on the psychological correlates of human longevity shows that people who live longer tend to have greater IQ scores, to be more conscientious, and to have been ill less often during childhood. OR
Research on human longevity shows that it tends to be correlated positively with IQ scores, with conscientious, and with good health during childhood.