Action Verbs and Character Subjects

Every sentence communicates **who does what**. In scientific writing, the *who* may be a human character (e.g. *researchers, scientists, we*) or an abstract character (e.g. *genes, bacteria, the climate, hydrogen*). Whether this character is a human or an abstraction, we will understand it most easily if it is written as the grammatical subject. Similarly, the action of that character is clearest when written as the main verb of the sentence. When you write with clear character subjects and action verbs,[1] readers can focus on your science rather than on figuring out what you're trying to say.

Action verbs

Verbs convey action and movement (e.g. *develop, grow, condense, explode*). However, too many scientific papers turn most of the verbs into nouns, which freezes the action into a thing and makes the writing stiff and difficult to understand. This is called **nominalization**; here are some typical examples:

Action	Nominalization
to evaluate	*evaluation*
to separate	*separation*
to measure	*measurement*
to immerse	*immersion*

Nominal style means writing with lots of nominalizations paired with lifeless verbs (e.g. *is, carry out, occur*). Native English speakers tend to prefer **verbal style**, in which sentences hinge on vibrant verbs.

Nominal style

1a) *An analysis of the data using a repeated measures ANOVA **was carried out**.*

2a) *The extraction of total RNA **was achieved** through the use of TRIzol reagent.*

Verbal style

1b) *We **analyzed** the data using a repeated measures ANOVA.*

1c) *The data **was analyzed** using a repeated measures ANOVA.*

2b) *We **extrated** total RNA using TRIzol reagent.*

2c) *Total RNA **was extracted** using TRIzol reagent.*

In sentences 1a and 2a, the verbs are *carry out* and *achieve*, but the true action of the sentence is *analyze* and *extract*. The sentences in the verbal style column all use the real-world action as their grammatical verb. And even though 1c and 2c are written in the passive voice, they are still easy to understand because of the verb choice.

Character subjects

When you start building sentences around action verbs, you will notice that these verbs naturally pair with character subjects. In other words, if your verb is *analyze*, you naturally write **who** analyzed or—in the passive—**what** was analyzed. In both cases, the subjects tend to be people or things that can perform an action. This is what we mean by **character subjects**—they are the protagonists of the scientific story, the stars of your show.

Non-character subjects

3a) The discovery of a cancer vaccine *will only be possible following a comprehensive understanding of the causes of cancer.*

Character subjects

3b) *To discover a cancer vaccine, **oncologists** must first comprehensively understand the causes of cancer.*

---

[1]These terms have been borrowed from Joseph Williams's book *Style: Lessons in Clarity and Grace.*

4a) Development of the fetus occurs within the nutrient-rich amniotic sac.

4b) The **fetus** develops within the nutrient-rich amniotic sac.

5a) The generation of executable code is achieved by the compiler.

5b) The **compiler** generates executable code.

Sentence 3b uses a human character subject—*oncologists*. This illustrates a useful rule of thumb: if there are humans directly involved in what you're describing, use them as subjects! Depending on your field, you might write about *engineers*, *software developers*, *educators* or *managers*. But often there are no humans in the scene, or you'd rather focus on a different agent—like *fetus* or *compiler* in sentences 4 and 5. That is also fine. The main question to ask is, Does this subject do the action in the scene? If so, it's probably a good choice as a subject.

But I thought scientific writing is supposed to use nominal style?

Young scientists sometimes overuse nominal style because they think it sounds more scientific or objective. However, editors from top scientific journals consistently recommend the "clear and accessible" language of verbal style.[2] The vast majority of English style guides—going back over 100 years—also recommend writers to choose verbal style as their default setting, saving nominal constructions for special cases.[3]

The problem with nominalizations is that they create a mismatch between the grammar and meaning of the sentence—that is, the main action is not expressed through a verb but through a noun. So what? Well, it's simply easier to understand and more fun to read when your grammar reflects how we perceive reality. In everyday terms, verbal style reads like a film clip and nominal style like a series of photos. Which do you prefer to watch, movies or slideshows?

When nominalizations can be helpful

Nominalizations should certainly not be thrown out altogether. They can be especially useful to concisely create cohesion between sentences:

> We measured the samples daily, monitoring the growth of each bacteria cluster. **These measurements** were then analyzed using linear regression.

Here the verb *measure* in the first sentence becomes the nominalization *measurement* in the second. It would be odd to insist on verbal style here, writing "We then analyzed what we measured using…" Rather, the word *measurement* serves as an umbrella noun, bringing together the entire preceding sentence in a single word.

But even here, note that the nominalization is not a long, complex phrase but just one word immediately followed by the verb.

Practice tip

To test your own default writing style, one technique is to go through your paper and underline all nominalizations. Consider whether you can make the sentences clearer by changing the nominalizations into active verbs, and then figure out what character subjects best fit to those verbs.

---

[2]"Writing for a *Nature* journal," www.nature.com/authors/author_resources/how_write.html (accessed 6 Oct. 2017). Also see the EWC handout called "Using the First Person" or the manual by Scitable – Nature Education on the EWC Writing Resources website.
[3]This is corroborated by Helen Sword's *Stylish Academic Writing*, which analyzed 84 academic writing style guides published between 2000 and 2010. Even Strunk & White's famous (or infamous) *Elements of Style* made the same recommendation back in 1918.