Express co-ordinate ideas in similar form

Formerly, science was taught by the textbook method, while now the laboratory method is employed.

Formerly, science was taught by the textbook method; now it is taught by the laboratory method.

An article or a preposition applying to all the members of a series must either be used only before the first term or else be repeated before each term.

The French, the Italians, Spanish, and Portuguese

The French, the Italians, the Spanish, and the Portuguese

In spring, summer, or in winter

In spring, summer, or winter (In spring, in summer, or in winter)

from Strunk, W., Jr. and White, E.B.: The Elements of Style

Express co-ordinate ideas in similar form

Correlative expressions (both, and; not, but; not only, but also; either, or; first, second, third; and the like) should be followed by the same grammatical construction.

It was both a long ceremony and very tedious.

The ceremony was both long and tedious.

A time not for words, but action.

A time not for words, but for action.

from Strunk, W., Jr. and White, E.B.: The Elements of Style

Express co-ordinate ideas in similar form

Not Parallel:

If you want to be a good pilot, you must study hard, permanently plan ahead, and you should be a good team player.

Practice

Parallel:

If you want to be a good pilot you must study hard, work well in a team, and plan ahead all the time. (imperative, imperative, imperative)

Parallel:

If you want to be a good pilot, you must be a good student, a good team player, and a foresighted thinker. (noun, noun, noun)

from Kristin Sainani, Stanford online course “Writing in the Sciences”

Write with verbs

Write with verbs

- Use strong verbs
- Avoid turning verbs into nouns
- Don’t bury the main verb

from Kristin Sainani, Stanford online course “Writing in the Sciences”

Use strong verbs

Compare:

> “Loud music came from speakers embedded in the walls, and the entire arena moved as the hungry crowd got to its feet.”

With:

> “Loud music **exploded** from speakers embedded in the walls, and the entire arena **shook** as the hungry crowd **leaped** to its feet.”*

*from the novel: Bringing Down the House, Ben Mezrich
from Kristin Sainani, Stanford online course “Writing in the Sciences”

Use strong verbs

Pick the right verb!

The WHO reports that approximately two-thirds of the world's diabetics are found in developing countries, and estimates that the number of diabetics in these countries will double in the next 25 year.

The WHO estimates that two-thirds of the world's diabetics are found in developing countries, and projects that the number of diabetics in these countries will double in the next 25 years.

from Kristin Sainani, Stanford online course "Writing in the Sciences"

Use strong verbs

Pick the right verb!

The WHO **reports** that **approximately** two-thirds of the world's diabetics are found in developing countries, and estimates that the number of diabetics in these countries will double in the next 25 year.

The WHO **estimates** that two-thirds of the world's diabetics are found in developing countries, and projects that the number of diabetics in these countries will double in the next 25 years.

from Kristin Sainani, Stanford online course "Writing in the Sciences"

Use strong verbs

Pick the right verb!

The WHO **reports** that **approximately** two-thirds of the world's diabetics are found in developing countries, and **estimates** that the number of diabetics in these countries will double in the next 25 year.

The WHO **estimates** that two-thirds of the world's diabetics are found in developing countries, and **projects** that the number of diabetics in these countries will double in the next 25 years.

from Kristin Sainani, Stanford online course "Writing in the Sciences"

Use strong verbs

- Use “to be” verbs purposefully and sparingly.
- Don’t kill verbs by turning them into nouns.
  - During DNA damage, recognition of H3K4me3 by ING2 results in recruitment of Sin3/HDAC and repression of cell proliferation genes.
  - During DNA damage, H3K4me3 recruits ING2 and Sin3/HDAC, which together repress cell proliferation genes.
  - During DNA damage, ING2 recognises H§K$me3, which together recruit Sin3 and repress cell proliferation genes.
- Don’t bury the main verb.
  - **In one study** comparing the effect of aircraft noise to the effect of alcohol on cognitive performance, it **was found** that simulated aircraft noise at 65 dB(A) had the same effect on individuals’ ability to recall auditory information as being intoxicated with a Blood Alcohol Concentration (BAC) level of at 0.10.
  - One study found that simulated aircraft noise at 65 dB(A) had the same effect on individuals’ ability to recall auditory information as being intoxicated with a Blood Alcohol Concentration (BAC) level of 0.10.

from Kristin Sainani, Stanford online course “Writing in the Sciences”

Use strong verbs

Really long subject! **Passive verb** **"Hedge" word**

Negatives **Buried predicate**

The fear expressed by some teachers that students would not learn statistics well if they were permitted to use canned computer programs has not been realized in our experience. A careful monitoring of achievement levels before and after the introduction of computers in the teaching of our course revealed no appreciable change in students' performances.

Many teachers feared that the use of canned computer programs would prevent students from learning statistics. We monitored student achievement levels before and after the introduction of computers in our course and found no detriments in performance.

from Kristin Sainani, Stanford online course "Writing in the Sciences"

Use strong verbs

Important studies to examine the descriptive epidemiology of autism, including the prevalence and changes in the characteristics of the population over time, have begun.

Practice

Studies have begun to describe the epidemiology of autism, including recent changes in the disorder's prevalence and characteristics.

from Kristin Sainani, Stanford online course "Writing in the Sciences"

Writing: Reasons, Types & Audience

Writing: Reasons, Types & Audience

Determine length, structure, and the (language) level of your writing

Why?	What?	For whom?
disseminate ideas	(conference) paper	peer (same field)
proof we understood a topic	seminar paper, thesis, survey	professors (and peers)
educate somebody	newspaper article, book	laymen
clarify own ideas	(research) notes	ourselves, coauthors
ask for support	grant/fellowship proposal	peers, grant agencies
“make money”	recommendation letters	employers

Writing: Reasons, Types & Audience

- Assess the background of your readers.
- Judge your reader's level of expertise.
- Determine the degree to which formality is required.
- (Know enough about the demographics of your audience that you can avoid inadvertently insulting or infuriating some of your readers or listeners.)

from Lyn Dupré: "BUGS in Writing: A Guide to Debugging Your Prose", Addison-Wesley

How to make a story sticky?

How to make a story sticky?

Why do some ideas stay with you while others are eminently forgettable?

SUCCES*
S: Simple
U: Unexpected
C: Concrete
C: Credible
E: Emotional
S: Stories

*from Chip and Dan Heath, Made to Stick (Random House, 2007)

How to make a story sticky?

Simple:
Simple message that captures the essence of an issue.
Prioritise.
NOT simplistic: a simple message does not trivialise the issue.
Even a great idea looses its meaning if it is bogged down by details.
“It’s the economy, stupid.”

Schemas:
Express your thoughts in a language that builds off ideas that your readers already know.
How people learn: start with existing schemas and then attach new information.
It’s hard to learn if you cannot fit it into an existing schema.
Establish schemas and then expand and modify them.
If you build off established schemas it makes ideas feel simple.

from Chip and Dan Heath, Made to Stick (Random House, 2007)
and from Joshua Schimel, Writing Science; how to write papers that get cited and proposals that get funded

How to make a story sticky?

Unexpected:
Use surprise—generate *interest* and *curiosity*.
The surprise shouldn't be too outlandish!
Best way to keep the reader's attention is to open gaps of knowledge.
And then fill those gaps.

from Chip and Dan Heath, Made to Stick (Random House, 2007)

How to make a story sticky?

Concrete:

“If those who have studied the art of writing are in accord on any one point, it is this: the surest way to arouse and hold the reader’s attention is by being specific, definite, and concrete.” [Strunk, W., Jr. and White, E.B.: The Elements of Style]

Abstract ideas are difficult to remember and understand, and they leave room for interpretation.
Explain your ideas in terms of human actions, in terms of sensory information.
“A bird in hand is worth two in the bush.”
Proverb: abstract truth, concrete language.

from Chip and Dan Heath, Made to Stick (Random House, 2007)

How to make a story sticky?

Credible:

Honesty and trustworthiness of a source.

A few people enjoy authority on certain topics, but most of us do not.

We have to establish the credibility of our ideas:

- Ground them in previous work, cite the sources
- Describe the methods how you obtained your data, present the data clearly
- Show that your conclusions grow from the credible data

Not just presentation of statistics:

- Can be helpful to illustrate a relationship between two concepts
- Rarely meaningful in themselves
- Remember that it's the relationships, not the numbers, that are important

from Chip and Dan Heath, Made to Stick (Random House, 2007)

How to make a story sticky?

Emotional:

“How do we get people to care about our ideas?”

Research shows that people are more likely to make a charitable gift to a single needy individual than to an entire impoverished region.

We are wired to feel things for people, not for abstractions.

from Chip and Dan Heath, Made to Stick (Random House, 2007)

How to make a story sticky?

The Truth About Movie Popcorn

Art Silverman stared at a bag of movie popcorn. It looked out of place sitting on his desk. His office had long since filled up with fake-butter fumes. Silverman knew, because of his organization's research, that the popcorn on his desk was unhealthy. Shockingly unhealthy, in fact. His job was to figure out a way to communicate this message to the unsuspecting moviegoers of America.

Silverman worked for the Center for Science in the Public Interest (CSPI), a nonprofit group that educates the public about nutrition. The CSPI sent bags of movie popcorn from a dozen theaters in

CSPI called a press conference on September 27, 1992. Here's the message it presented: "A medium-sized 'butter' popcorn at a typical neighborhood movie theater contains more artery-clogging fat than a bacon-and-eggs breakfast, a Big Mac and fries for lunch, and a steak dinner with all the trimmings—combined!"

showed, coconut oil was also brimming with saturated fat.

The single serving of popcorn on Silverman's desk—a snack someone might scarf down between meals—had nearly two days' worth of saturated fat. And those 37 grams of saturated fat were packed into a *medium*-sized serving of popcorn. No doubt a decent-sized bucket could have cleared triple digits.

The challenge, Silverman realized, was that few people know what "37 grams of saturated fat" means. Most of us don't memorize the USDA's daily nutrition recommendations. Is 37 grams good or bad? And even if we have an intuition that it's bad, we'd wonder if it was "bad bad" (like cigarettes) or "normal bad" (like a cookie or a milk shake).

from Chip and Dan Heath, Made to Stick (Random House, 2007)

How to make a story sticky?

Emotional:
Slightly awkward for scientists.
Good science = objective about your work
But, fundamental: curiosity.
Engage our curiosity: ask a novel question.
E is closely aligned with U—unexpected things create curiosity.
Shift from “what’s my answer?” to “what’s my question?”
Engage and then satisfy our curiosity.

from Joshua Schimel, Writing Science; how to write papers that get cited and proposals that get funded

How to make a story sticky?

Stories:
See your work as a story and present it that way.
Stories are modular: a single large story consists of a collection of small stories.
Think about the internal structure of your paper and how to integrate story modules.

When a leader makes an argument in support of a new idea, these arguments encourage evaluation, judgment, debate, and criticism. When a new idea is presented as part of a story, however, the audience is engaged in the idea and welcomed to participate in exploring its implementation.*

from Joshua Schimel, Writing Science; how to write papers that get cited and proposals that get funded
* from Kylie Goodell, review of Chip and Dan Heath, Made to Stick (Random House, 2007)

Story Structure

Story structure

Opening (O).
Whom is the story about? Who are the characters? Where does it take place? What do you need to understand about the situation to follow the story? What is the larger problem you are addressing?
Challenge (C).
What do your characters need to accomplish? What specific question do you propose to answer?
Action (A).
What happens to address the challenge? In a paper, this describes the work you did.
Resolution (R).
How have the characters and their world changed as a result of the action? What did you learn from your work?
OCAR

from Joshua Schimel, Writing Science; how to write papers that get cited and proposals that get funded

OCAR

There exist other story structures that do not follow this order, here, we concentrate on just that.

OCAR needs a “patient” reader.

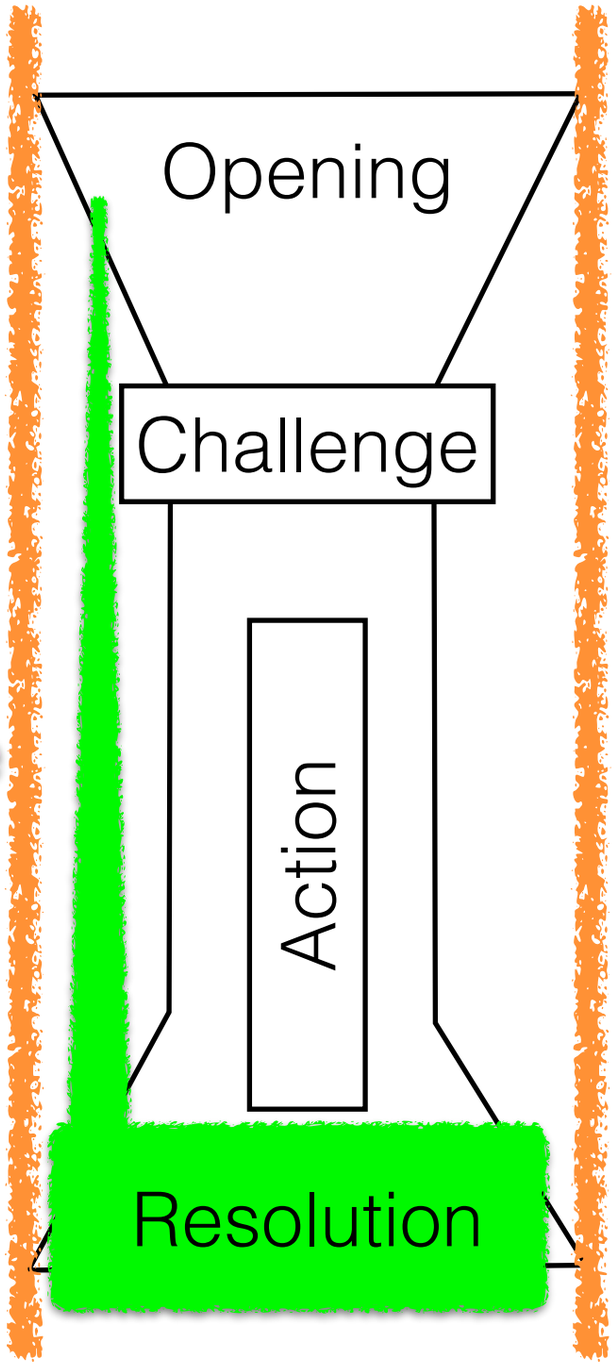
Paper’s challenge at the end of the introduction.

Paper’s conclusion at the end.

Other structures, see for example Joshua Schimel, Writing Science; how to write papers that get cited and proposals that get funded.

Story structure

must map back to the opening



Introduction: introduce characters and question. Give Background.Narrow down to your specific question.

Materials, Methods, Results: What you did and what you found

Discussion: What it means

Conclusion: Take home message

from Joshua Schimel, Writing Science; how to write papers that get cited and proposals that get funded

Story structure

Opening (O).
Identify the problem that drives the research/the report, introduce the characters, and target an audience.
Identify a problem of broad interest and give the reader a sense of where the story is going.
Do not use an opening that explains a widely held schema.
Ok to explain things to yourself in a first draft, but when you revise, figure out where the real story starts.
You must know the intended audience to tailor the writing to them.

Schimel et al. submitted proposals to two agencies:

- National Science Foundation
- Agency with a management focus (California Environmental Protection Agency)

- The influence of fog on ecological and hydrological processes in coastal zones has long intrigued scientists.
- California's coastal forests are among its most distinctive and treasured national resources.

from Joshua Schimel, Writing Science; how to write papers that get cited and proposals that get funded

The Funnel: Connecting the O and C

Opening: Identifies a large problem
Challenge: Defines a specific question
Main body of the introduction must connect these elements.
Build the argument that to make progress on the large problem, you must answer the specific question.
Frame the knowledge gap: U and E

from Joshua Schimel, Writing Science; how to write papers that get cited and proposals that get funded

Story structure

Challenge (C).
Describe the specific knowledge you hope to gain.
Start with the question that drove your work!
“to learn X, we did Y.”
Not just “we did Y”, and leave out “to learn X…”

from Joshua Schimel, Writing Science; how to write papers that get cited and proposals that get funded

Story structure

Action (A).
"You are not just presenting your results, you are telling a story."

In a paper: Materials, Methods, Results, most of the Discussion.
Embed the action within the larger story.
What is the point of all that work?
What do these results mean?
Do they answer your question?

from Joshua Schimel, Writing Science; how to write papers that get cited and proposals that get funded

Story structure

Resolution (R).
People remember the last thing you say.
“Take-home message”
Show how your understanding has advanced.
Good resolution: reiterates the action, answers the questions raised in the challenge, and demonstrates how those answers contribute to the larger problem.
Do not put anything but that new insight in your resolution.
If the most important thing you discover is that there is a new question, make the question concrete, and be clear how it grew from your work—you didn’t fail to fill one knowledge gap but identified a new one.

Not good:

- Weak: summarise the results, tell your reader that they are important, but do not clarify how. Not an answer to the questions raised.
- Distracting: include ideas that should be in the introduction or in a textbook.
- Undermine your conclusions: “more research is needed to clarify our findings”.

➡ Focus on what you *haven’t* accomplished.

from Joshua Schimel, Writing Science; how to write papers that get cited and proposals that get funded

Resolution (R).

To conclude, 3-mehty-ambrosia offers a new approach for thyroid carcinoma therapy. Our data provide evidence on safety and in vivo activity of this compound in patients with this condition, although the proof for clinical benefit remains to be established in future clinical trials.

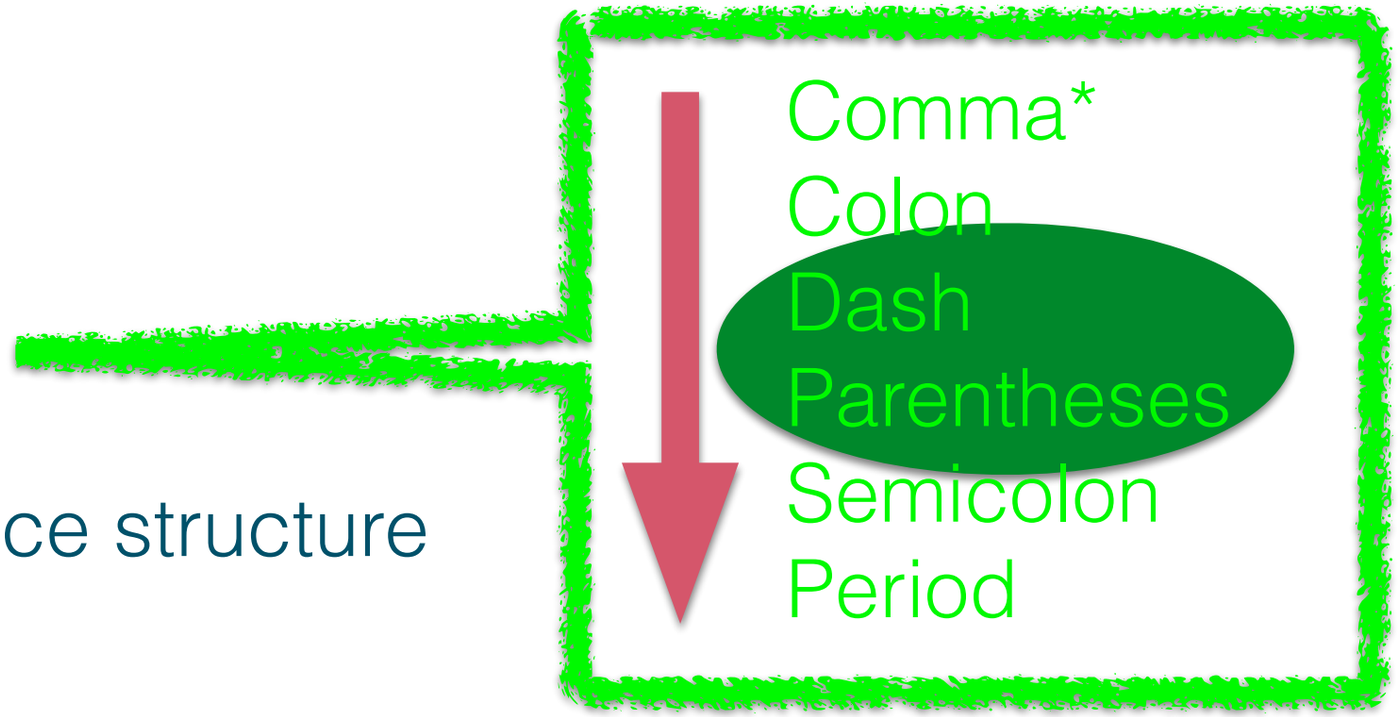
While further clinical trials will be necessary to establish the full benefits of 3-methyl-ambrosia as a therapeutic agent, our data provide evidence that it is safe and shows in vivo activity against thyroid tumors. 3-Methyl-ambrosia therefore may offer a new approach for treating patients with thyroid carcinoma.

from Joshua Schimel, Writing Science; how to write papers that get cited and proposals that get funded

Punctuation

less formal

Use punctuation
- ❖ Correctly
- ❖ To vary sentence structure



Increasing power to separate

*from Kristin Sainani, Stanford online course “Writing in the Sciences”

Punctuation

Why correctly?

What should this mean?
We had one problem only Janet knew we faced bankruptcy

We had one problem: only Janet knew we faced bankruptcy.

We had one problem only: Janet knew we faced bankruptcy.

We had one problem only, Janet knew: we faced bankruptcy.

We had one problem only Janet knew we faced: bankruptcy.

Bad punctuation:
We had one problem only, Janet knew we faced bankruptcy.

from R.L. Track, Penguin Guide to Punctuation

Punctuation

FULL STOP/PERIOD:

❖ Marks the end of a sentence expressing a statement.

Something wrong?
Norway has applied for EC membership, Sweden is expected to do the same.

Two complete sentences, but the first one has been punctuated only with a comma.

Norway has applied for EC membership. Sweden is expected to do the same.

Each statement has its own full stop.

Norway has applied for EC membership, and Sweden is expected to do the same.

We used the connecting word *and* to combine the two statements into a longer statement.

from R.L. Track, Penguin Guide to Punctuation

Punctuation

COMMA:

- When making lists.
- Bracketing information that is not central to the sentence.
- After linking words like however, furthermore, additionally, … at the start of a sentence, or after a phrase that qualifies or introduces the main part of the sentence.
  - In this section, we survey the airline fleet assignment problem.
- NO comma goes before “that” in sentences like:
  - …, and we demonstrate that schedule reliability is highest for direct routing.

Punctuation

COMMA:

❖*Listing comma:*

- As a kind of substitute for the word *and*, or sometimes for *or*.
- Used in a list when three or more words, phrases or even complete sentences are joined by the word *and* or *or*.
- In a series of three or more terms with a single conjunction, use a comma after each term except the last. (Oxford comma, serial comma.)

➡ …red, white, and blue.

➡ He opened the letter, read it, and made a note of its contents.

from R.L. Track, Penguin Guide to Punctuation and Strunk, W., Jr. and White, E.B.: The Elements of Style

Punctuation

Oxford comma

https://www.youtube.com/watch?v=0jS3VyRYYCQ

We invited the strippers, JFK, and Stalin.
The woods were lovely, dark and deep,