"So-and-so is such a good writer"

No.

"So-and-so is such a good *editor*"

Ta-Nehisi Coates
@tanehisicoates

Following

Someday I'll post the first draft to the Case for Reparations or something. It always starts horrible.

Ta-Nehisi Coates
@tanehisicoates

Following

Four? First one was awful.

> **Will Hochman** @WillHochman
> @tanehisicoates How many drafts did you go through for Between the World and Me?

Why is editing hard?

Difficulties vary with different types of edits

- Editing your own work
- Working with others to edit your work

Why is editing your own work hard?

The secret to #editing your work is simple: you need to become its reader instead of its writer.
ANNA DEAVERE SMITH

#amwriting #writing

It is hard to sense a reader's confusion, when you know what you meant.

The best solution is time. Always edit on a different day.

More tricks for editing your own work

Read it in a different way than you wrote it.

- On a printout
- Out loud
- Have someone (or Siri) read it to you
- In a location where you typically read

It is hard to undo work you struggled over.

The best solution is practice.

The less "emotional overhead" you suffer when writing, the less overwhelming changes will be..

It is hard to face errors you have made.

However, you are a scientist.

Evaluating, correcting, and improving are *fundamental* to science.

Why is accepting editing from others hard?

We learn to do anything by making mistakes, having experts point them out, and then fixing the mistake.

This experience can be emotionally complex for writing,
because writing merges "text" with "your ideas and thoughts"

We don't like to be criticized.

We *really* don't like to be criticized when we worked hard and struggled.

We *really, really* don't like to be criticized when the critique leads to more, emotionally-exhausting work.

But.

We learn to do anything by making mistakes, having experts point them out, and then fixing the mistake.

If you cannot accept & learn from critique, you will not improve.

Remember: A heavy edit is filled with love.

"*Look how invested my advisor is in my success!*"

Active vs Passive voice

Active Voice

- Reduces ambiguity.

  Active: "*We reduced the ALMA data…*"

  Passive: "*The ALMA data was reduced…*", but by who? ALMA data center? The authors?

- Requires fewer words, producing shorter, clearer sentences.

- Reduces the likelihood of writing subordinate clauses that do not refer back to the subject of the sentence.

Passive Voice

Passive voice is not intrinsically bad!

Can keep the true topic of the sentence in lead position.

"PNe can be identified by their strong OIII emission."

Passive, but stresses PNe

versus

"Strong OIII emission can indicate the presence of a PNe."

Active, but stresses OIII

Passive Voice

Passive voice is not intrinsically bad!

Can add variety, if used appropriately (i.e., when not mixed with active in the same sentence).

Inappropriate mixing of active and passive voice

"We removed the large scale gradient using the illumination correction, then cosmic rays were identified."

Effective mixing of active and passive voice

"PNe can be identified by their strong OIII emission. We searched for this emission using narrow-band imaging."

"PNe can be identified by their strong OIII emission. We searched for this emission using narrow-band imaging."

The passive voice works here because the "missing actor" is truly generic.

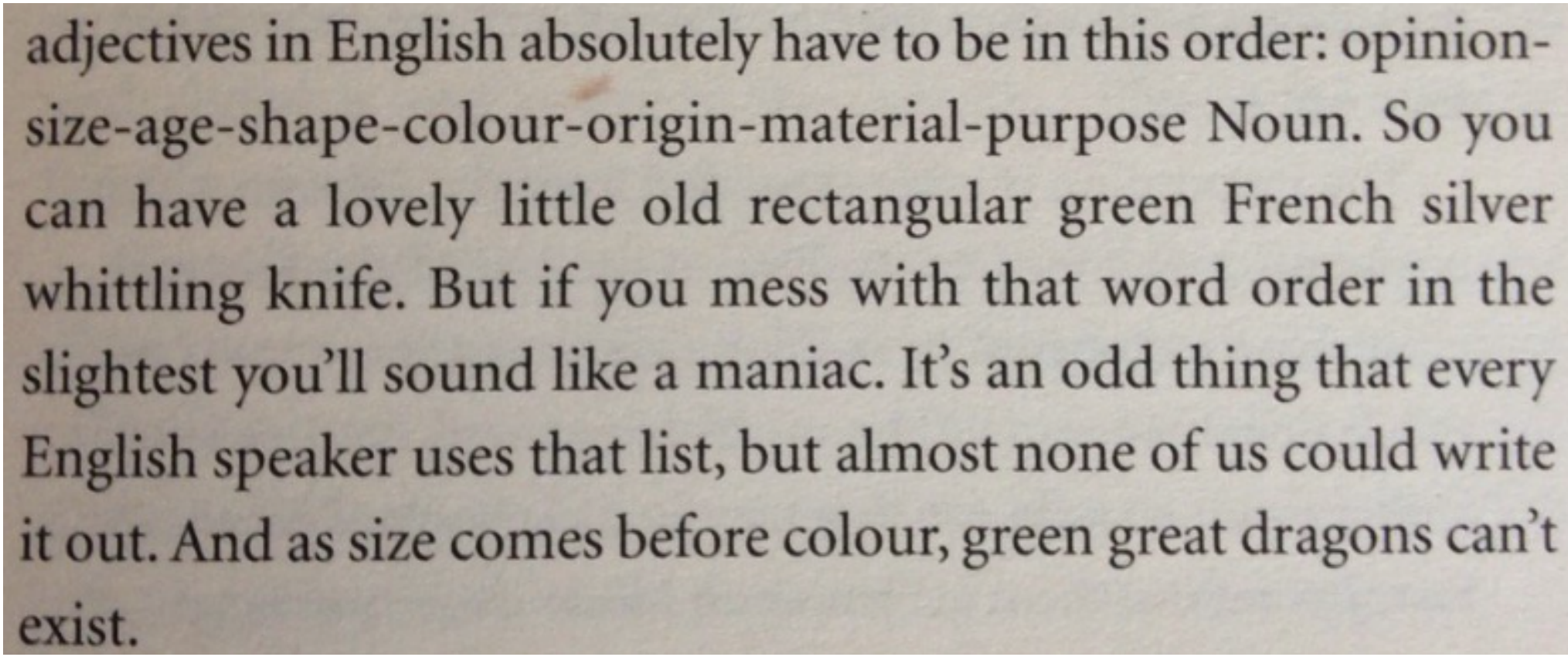
"PNe can be identified by their strong OIII emission. This emission was searched for using narrow-band imaging."

The passive voice does *not* work here because the "missing actor" is a *specific* person/group — the authors.

"PNe can be identified by their strong OIII emission. This emission was searched for using narrow-band imaging."

Proposals and analysis sections should *always* favor active voice.

An unrelated grammar aside that I ran across:



adjectives in English absolutely have to be in this order: opinion-size-age-shape-colour-origin-material-purpose Noun. So you can have a lovely little old rectangular green French silver whittling knife. But if you mess with that word order in the slightest you'll sound like a maniac. It's an odd thing that every English speaker uses that list, but almost none of us could write it out. And as size comes before colour, green great dragons can't exist.

From: The Elements of Eloquence: Secrets of the Perfect Turn of Phrase

On to paragraphs

What is a paragraph?

Trivial definition:

More than one sentence.

What *is* a paragraph?

Better definition:

A single, rhetorical unit

What *is* a paragraph?

Every paragraph should have exactly one topic.

What *is* a paragraph?

That topic should be *distinct* from the topics of other paragraphs.

What *is* a paragraph?

Every paragraph should have a purpose*.

*i.e., a reason to exist

One topic per paragraph

The narrower the topic, the clearer the paragraph

A good paragraph

It is instructive to understand which aspects of the model are driving agreement with the data. The normalization of the model predictions depend on the evolution of ϕ^*, the redshift-dependent normalization of the stellar mass function, while the shapes depends on α^* and M^*, although the latter two dependencies are much weaker than the first. Recall that we have tuned the evolution of ϕ^* to reproduce the normalization of the SFR$-M_{\rm star}$ relations, but not the shape of these relations. The shape is thus a robust prediction of our approach, while the normalization agrees with the data by construction.

Conroy & Weschler 2009

It is instructive to understand which aspects of the model are driving agreement with the data. The normalization of the model predictions depend on the evolution of ϕ^*, the redshift-dependent normalization of the stellar mass function, while the shapes depends on α^* and M^*, although the latter two dependencies are much weaker than the first. Recall that we have tuned the evolution of ϕ^* to reproduce the normalization of the SFR$-M_{\rm star}$ relations, but not the shape of these relations. The shape is thus a robust prediction of our approach, while the normalization agrees with the data by construction.

It has one clear topic, clearly stated up front

Conroy & Weschler 2009

Another good paragraph

The currently most productive set of indirect techniques for observing exoplanet atmospheres are those for systems where the planet transits and is eclipsed by its host star. These techniques do not require high spatial resolution, as the planet and star do not need to be spatially separated on the sky. Observations are made in the combined light of the planet and star (Figure 3-7) with the exoplanet spectrum separated out by comparison with observations of the star alone. As seen from a telescope, when the planet goes in front of the star, the starlight passes through the planet atmosphere and planet atmosphere spectral features are imprinted on the stellar spectrum. This is called transmission photometry or spectroscopy. When the planet goes behind the star, the planet disappears and reappears, adding either reflected light or thermal emission to the combined planet-star radiation. This is referred to as secondary eclipse photometry or spectroscopy.

Again, one clear topic, highlighted in first sentence

HDST Report

Both paragraphs lead with the main topic.

This is the same "reader signaling" that we discussed for choosing the beginning of a sentence.

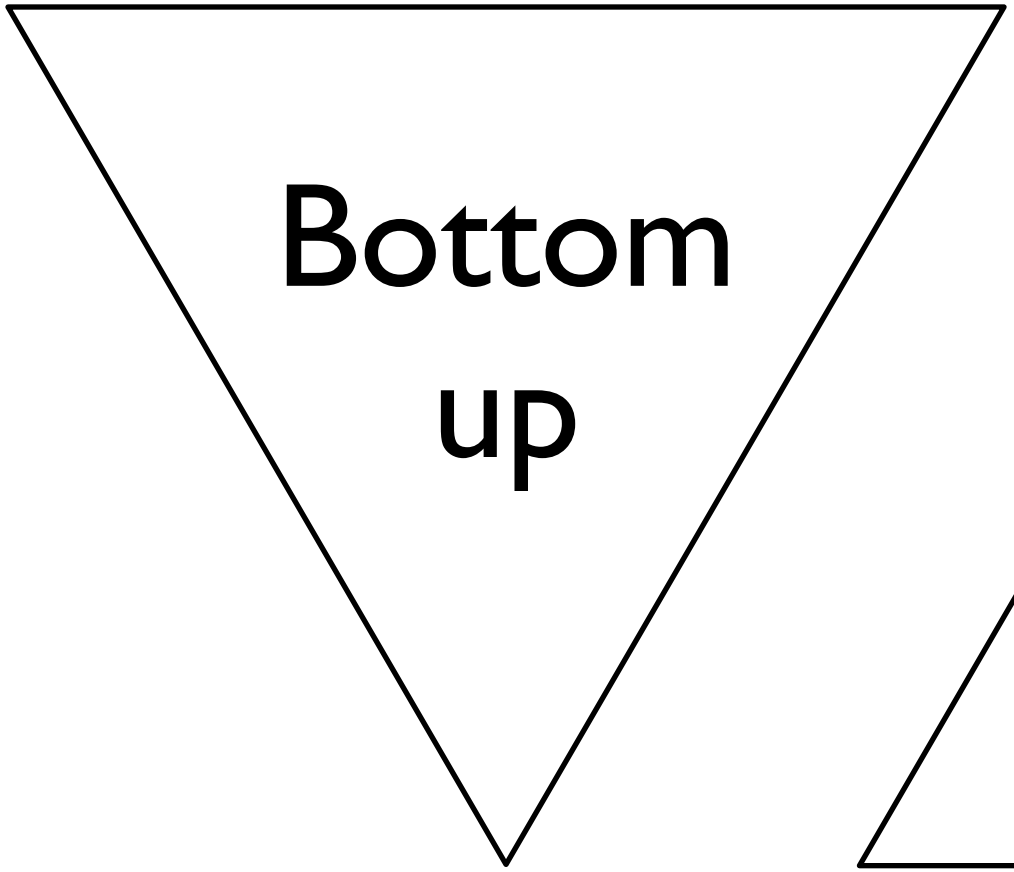
Both paragraphs lead with the main topic.

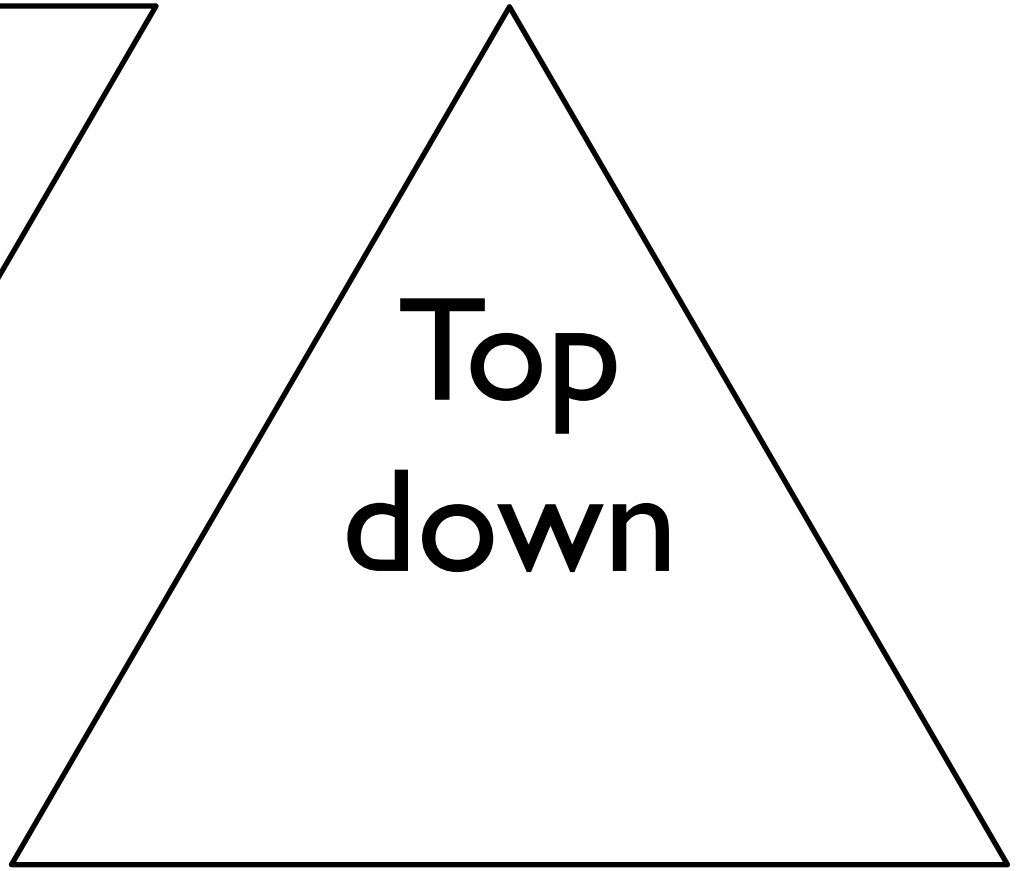
This topic can be introduced with one or two sentences.

What else goes in a paragraph, besides a statement that conveys the main topic?

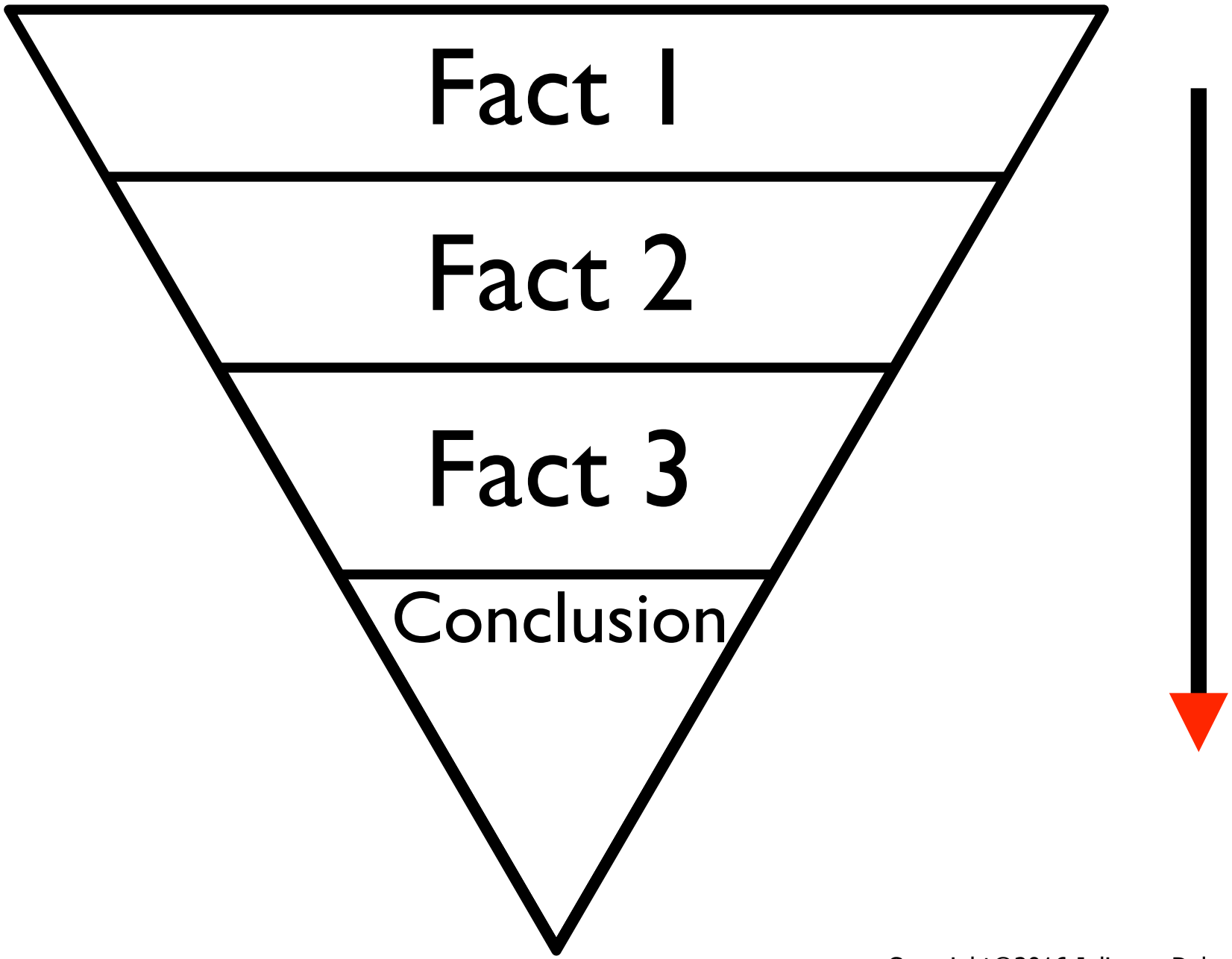
Information that supports or clarifies the main topic, *only*.

There are two ways to present supporting info in a paragraph.

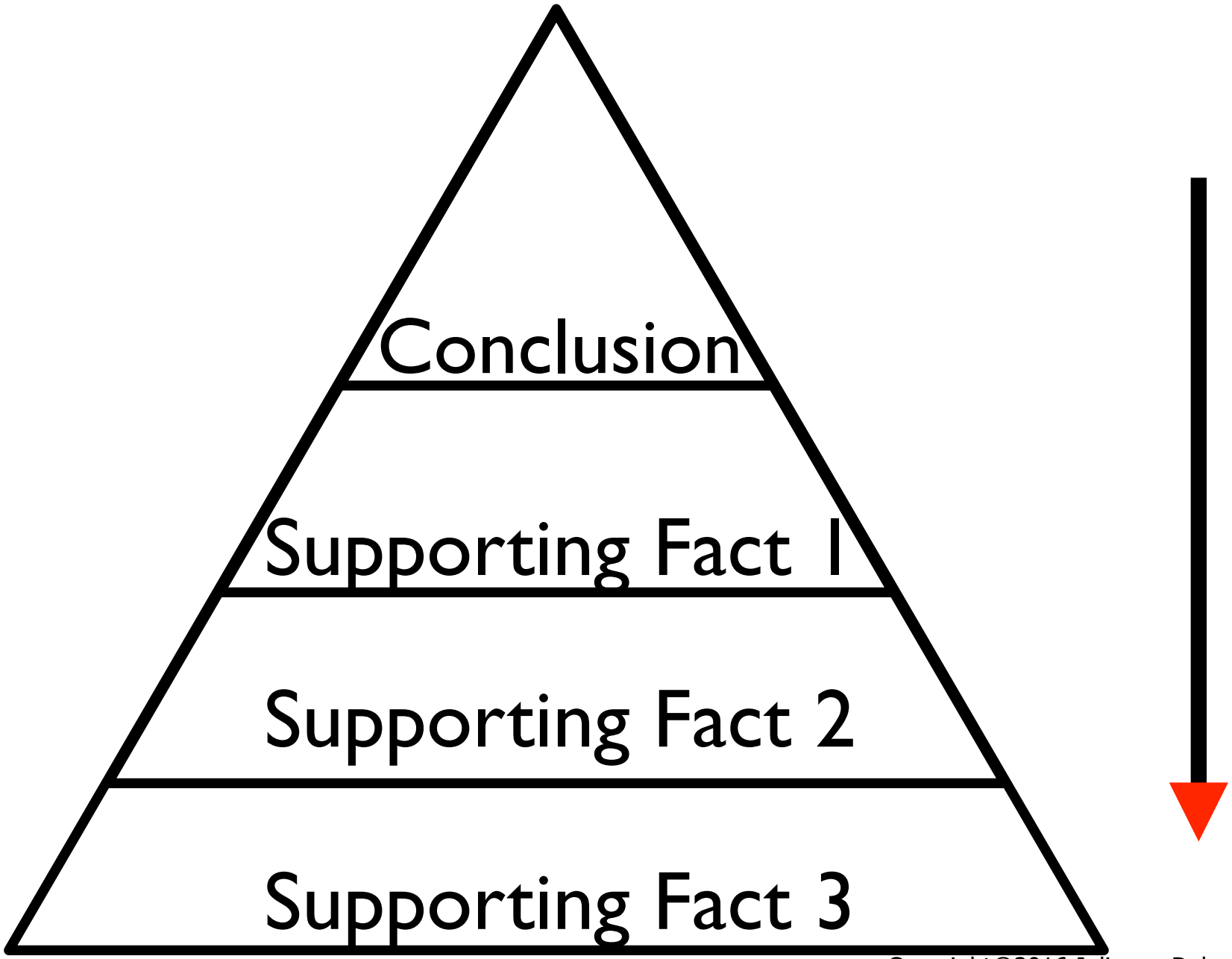




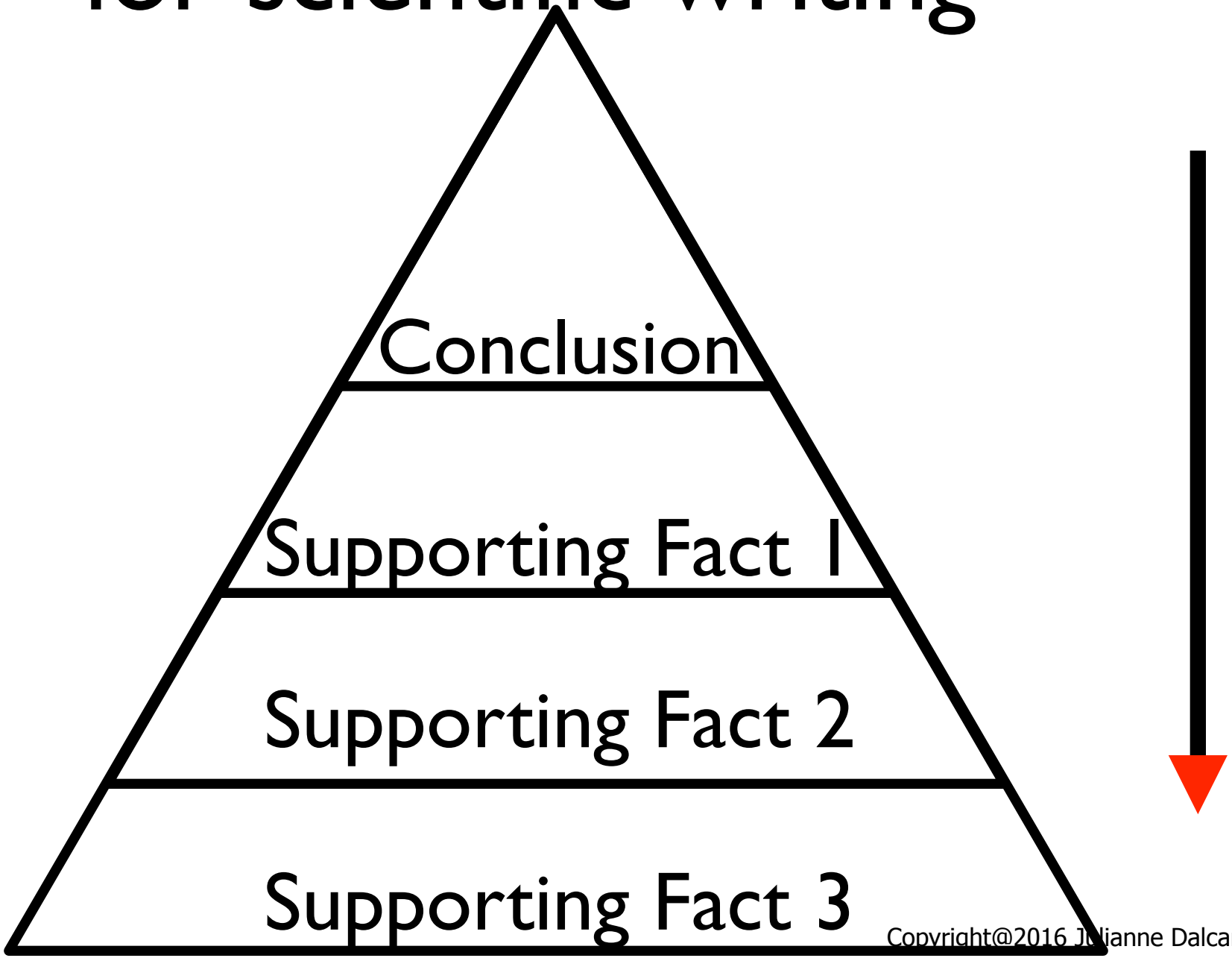
Bottom up



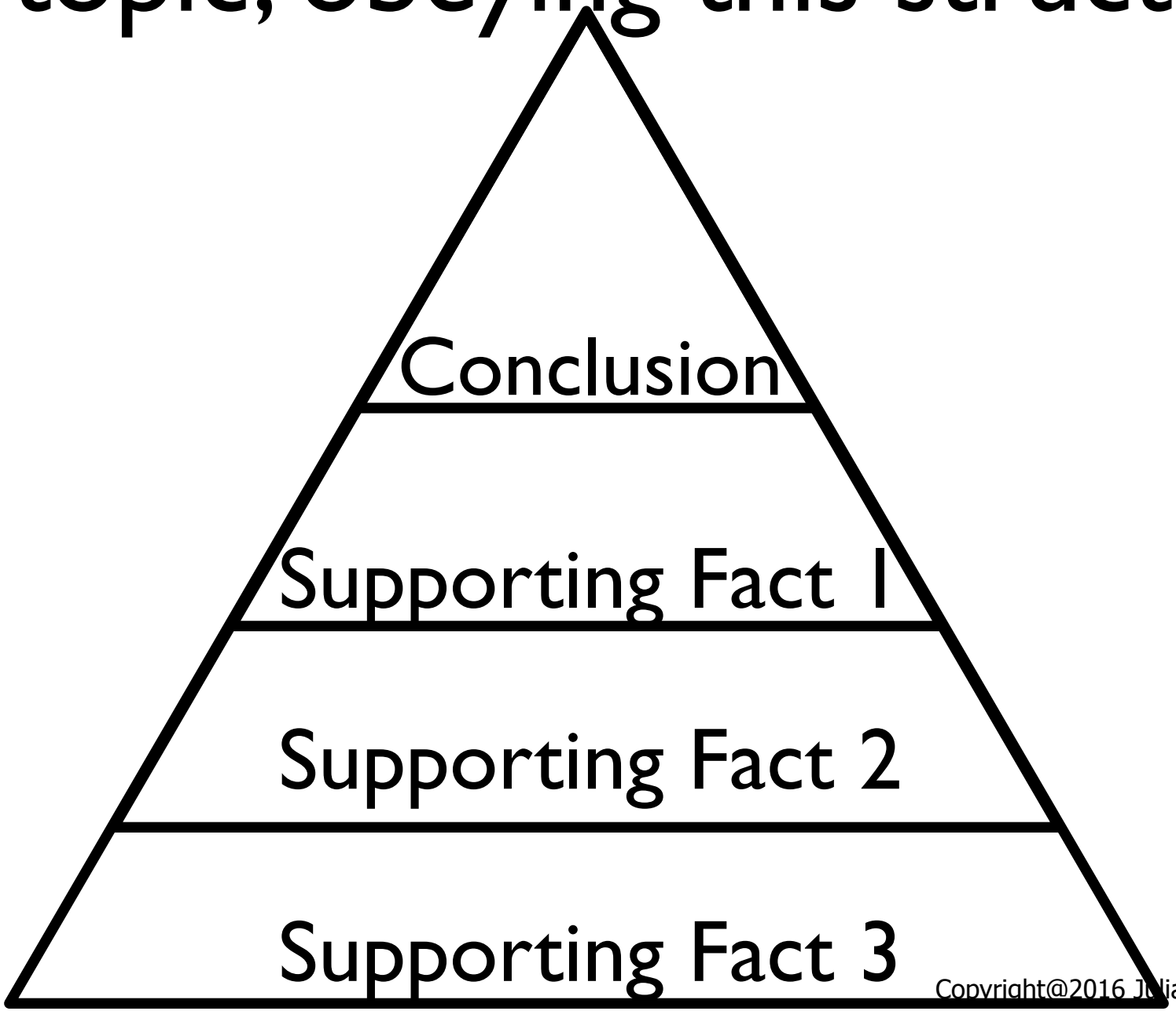
Top Down



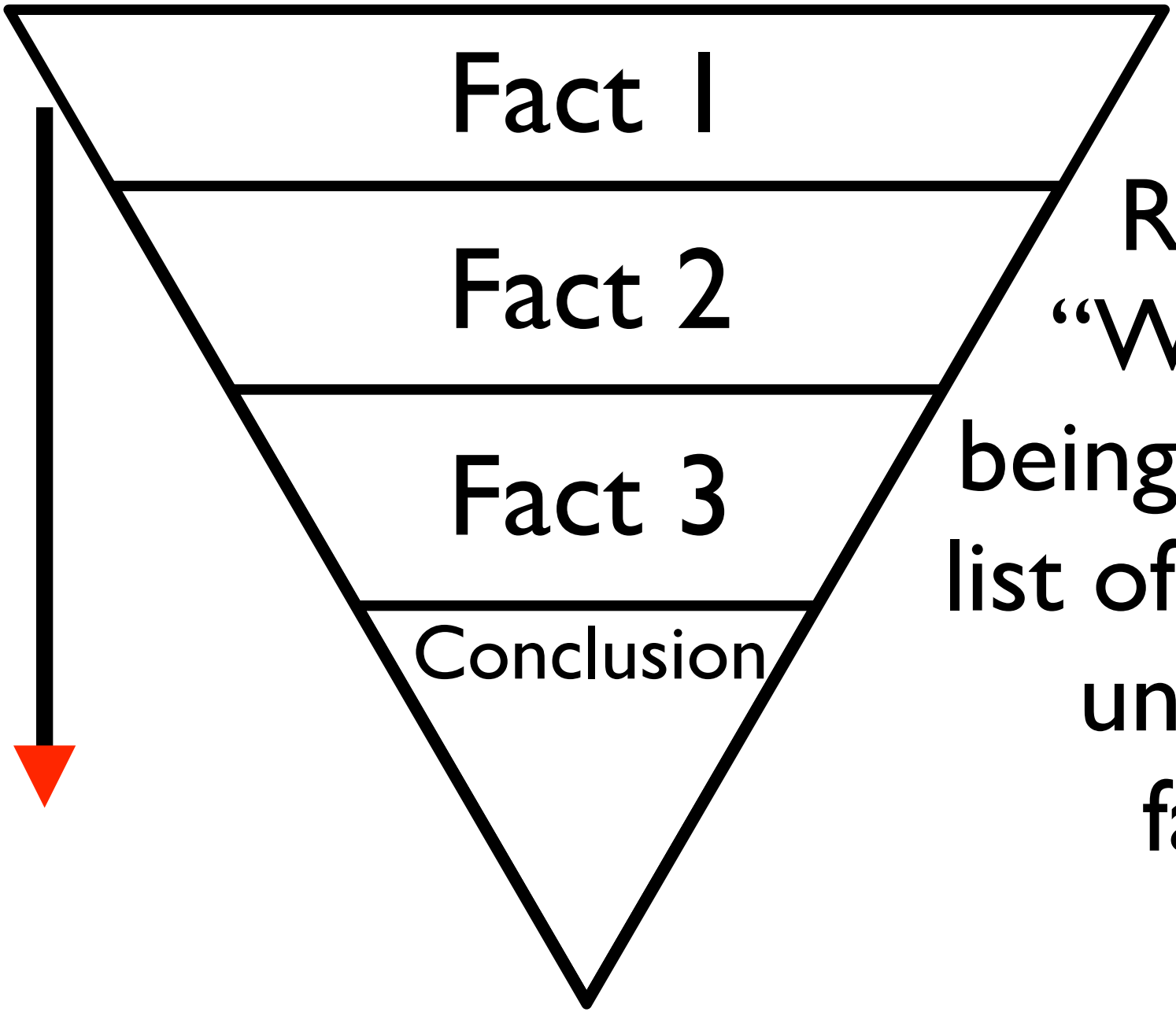
This structure is much clearer for scientific writing



The "good" paragraphs *began* with the topic, obeying this structure.

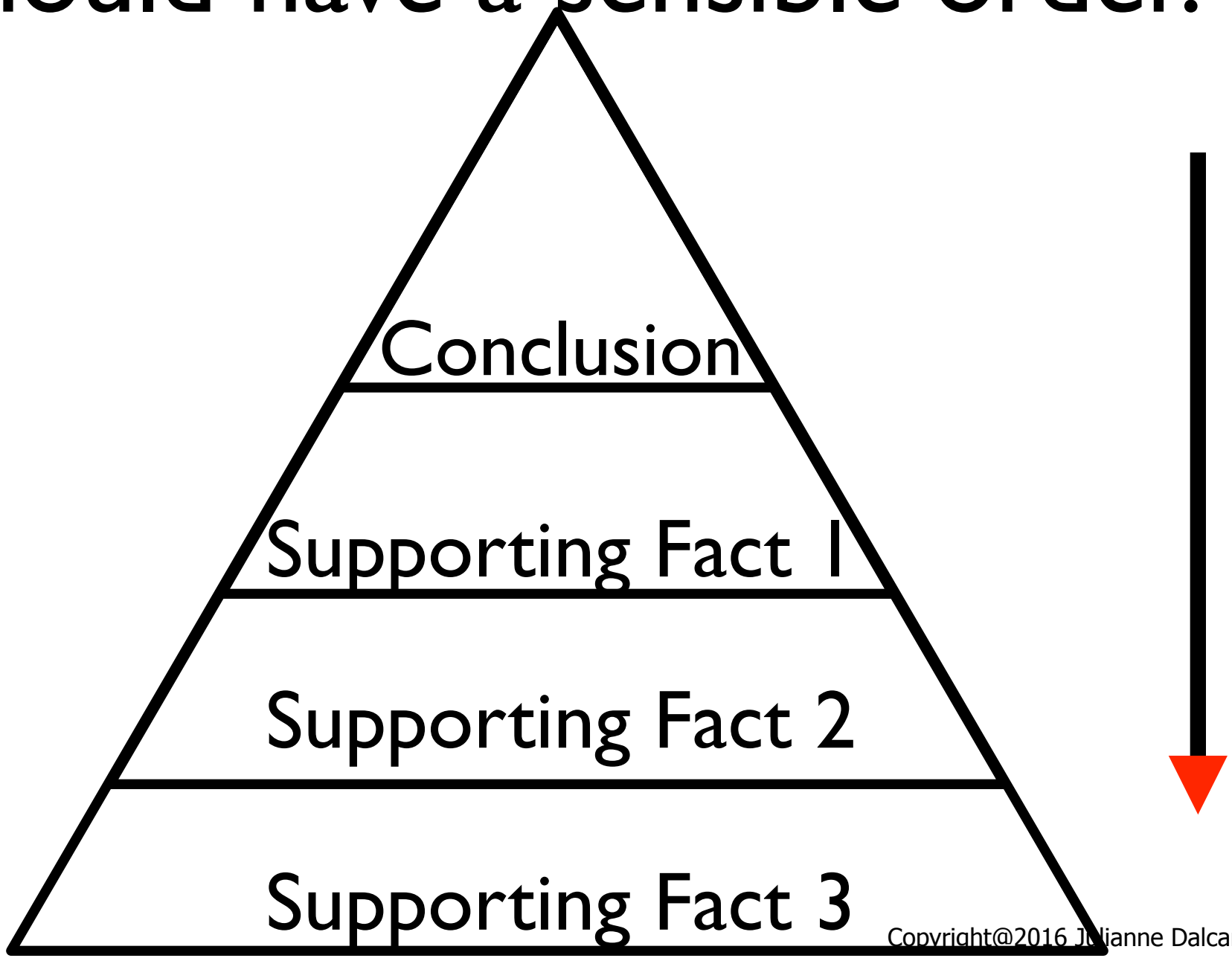


Contrast with

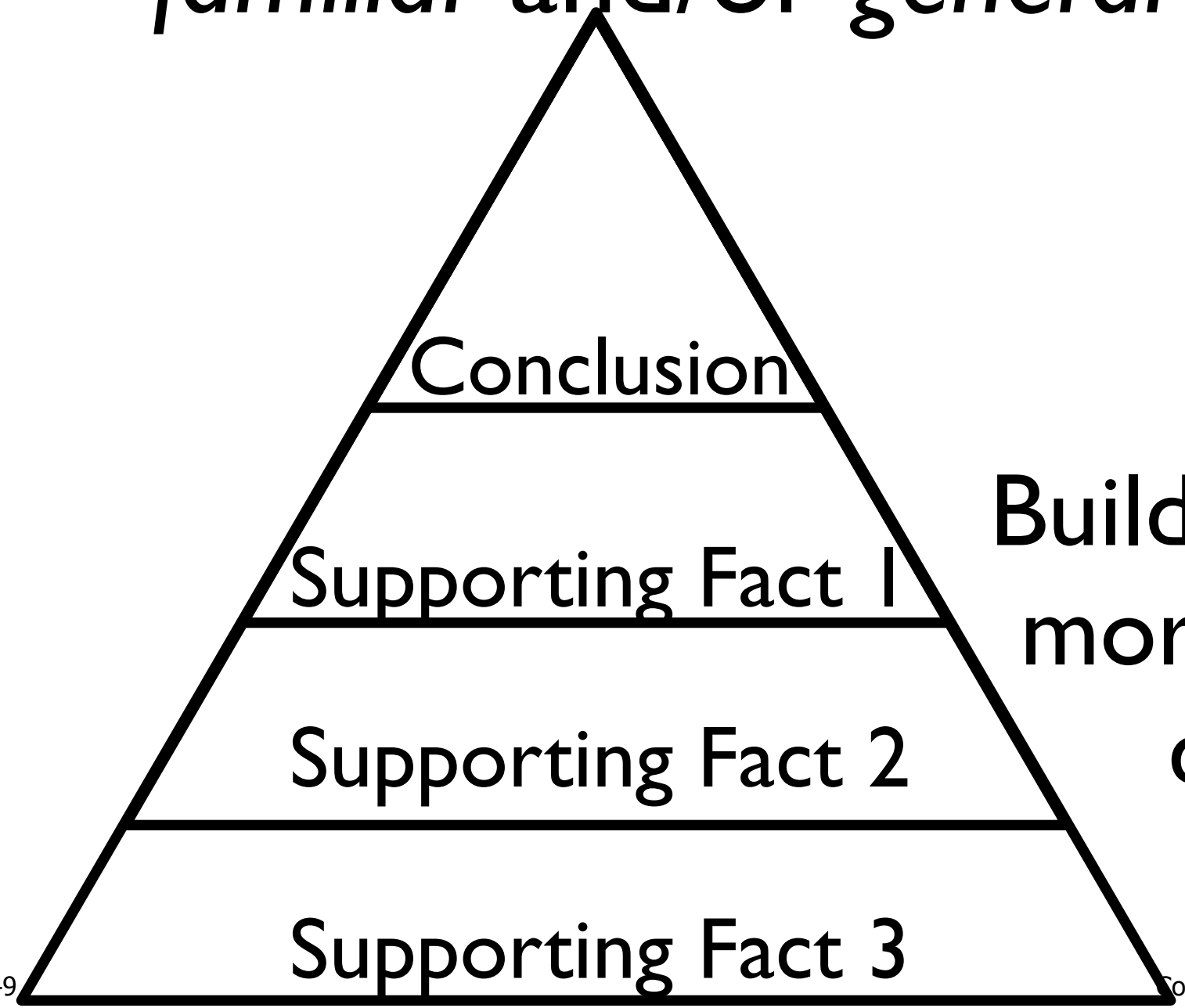


Reader:
"Why am I being given this list of seemingly unrelated facts?"

The supporting information should have a sensible order.

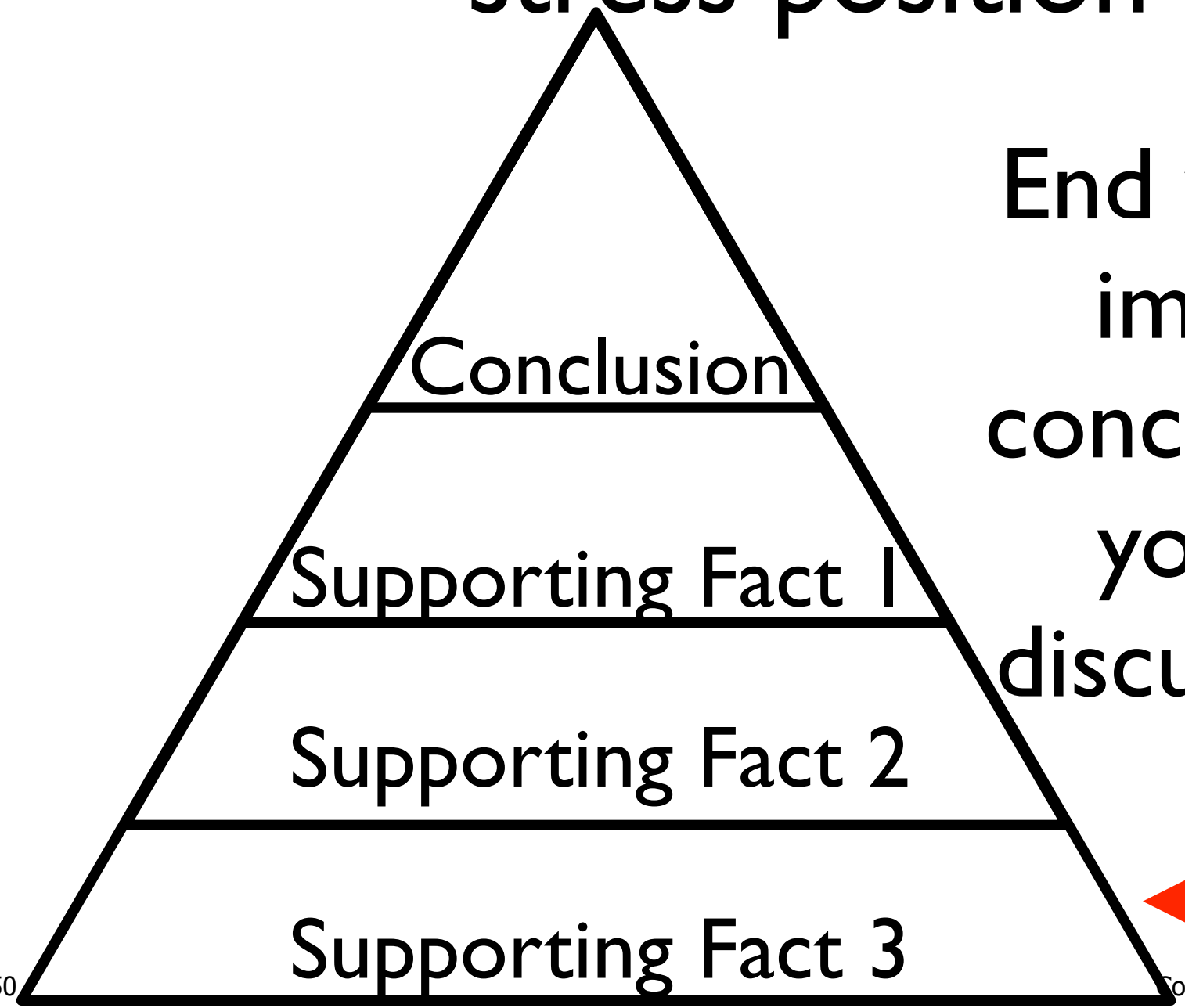


Series should start with *most familiar* and/or *general* facts



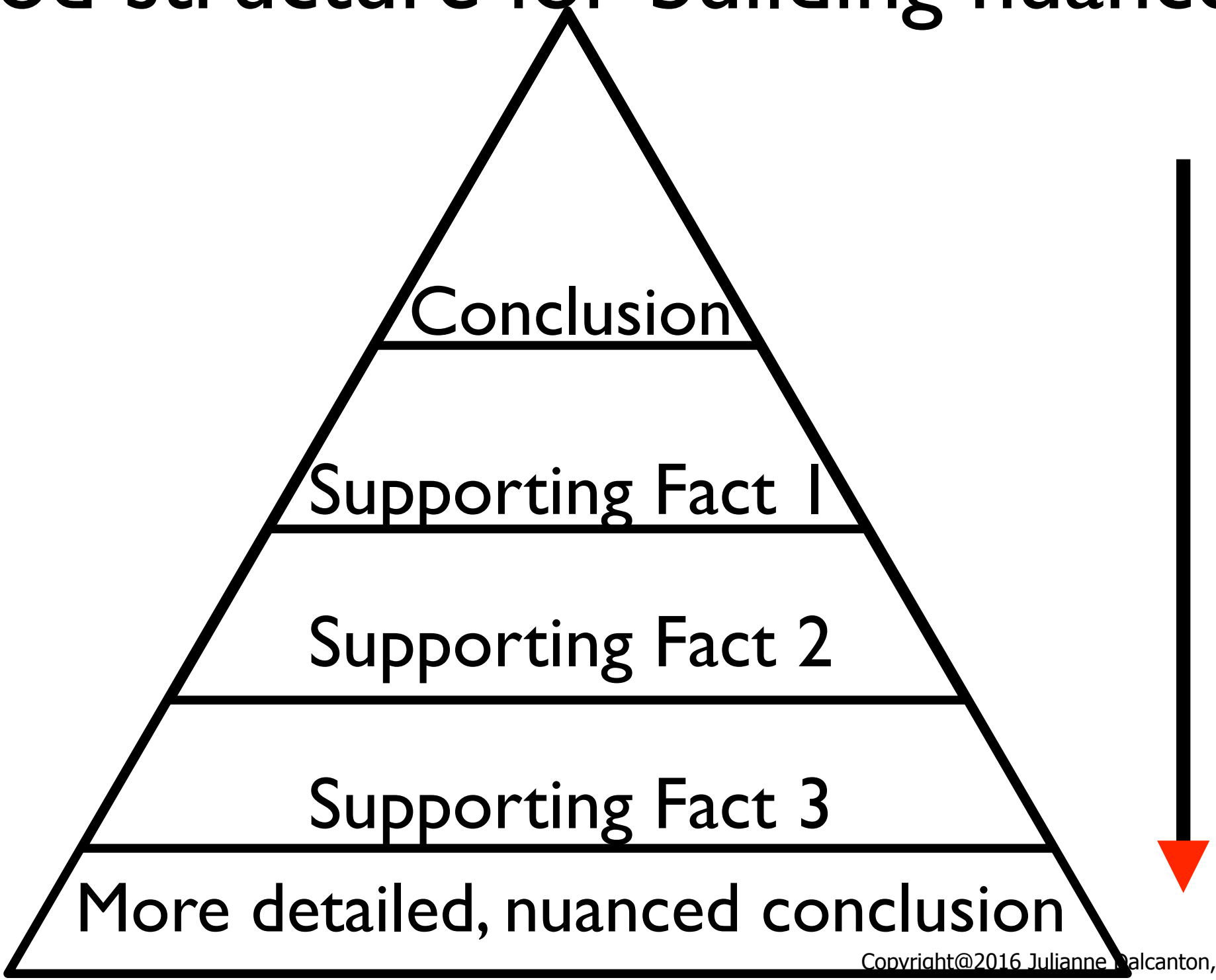
Build to newer, more specific details

The last fact/sentence is in a "stress position"



End with most important conclusion that you might discuss further

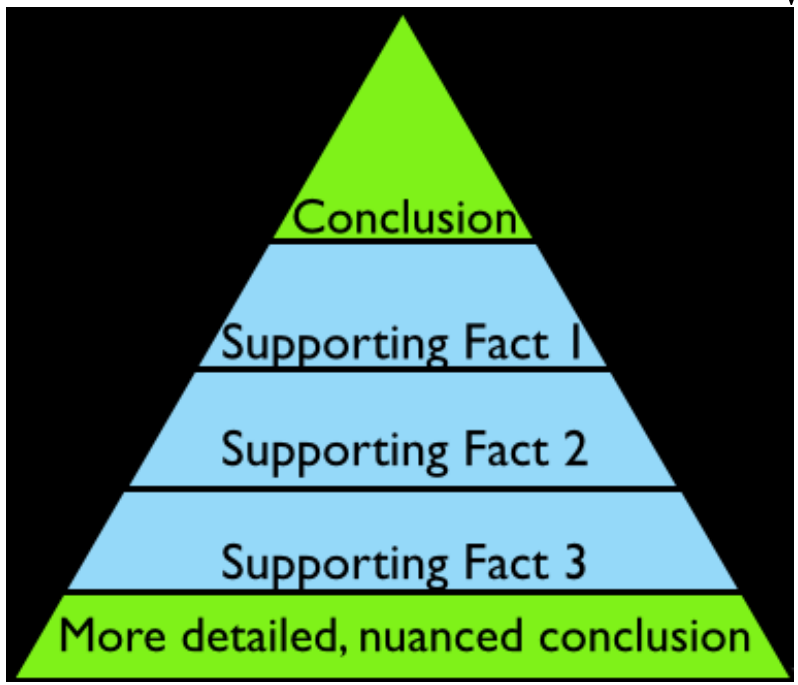
Good structure for building nuance.



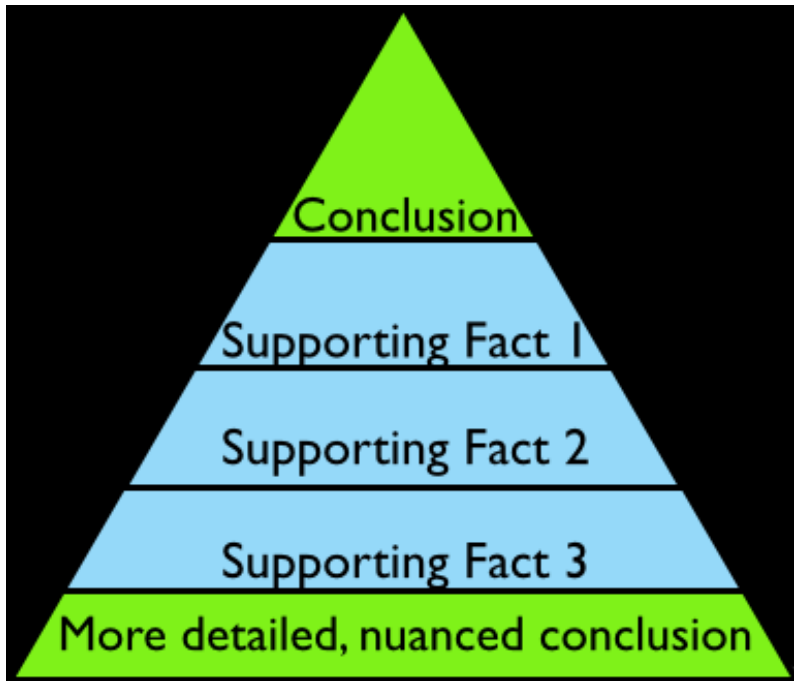
Example of top down, building nuance

Selection effects are severe for transit surveys. In addition to the obvious requirement that the planetary orbit be oriented nearly perpendicular to the sky plane, there are strong biases favoring large planets in tight orbits. In an idealized wide-field imaging survey, the effective number of stars that can be searched for transits varies as the orbital distance to the 5/2 power and the planet radius to the sixth power (Pepper et al. 2003). It is a struggle to bring the occurrence rate to light when buried beneath such heavy biases.

Winn & Fabrycky 2015

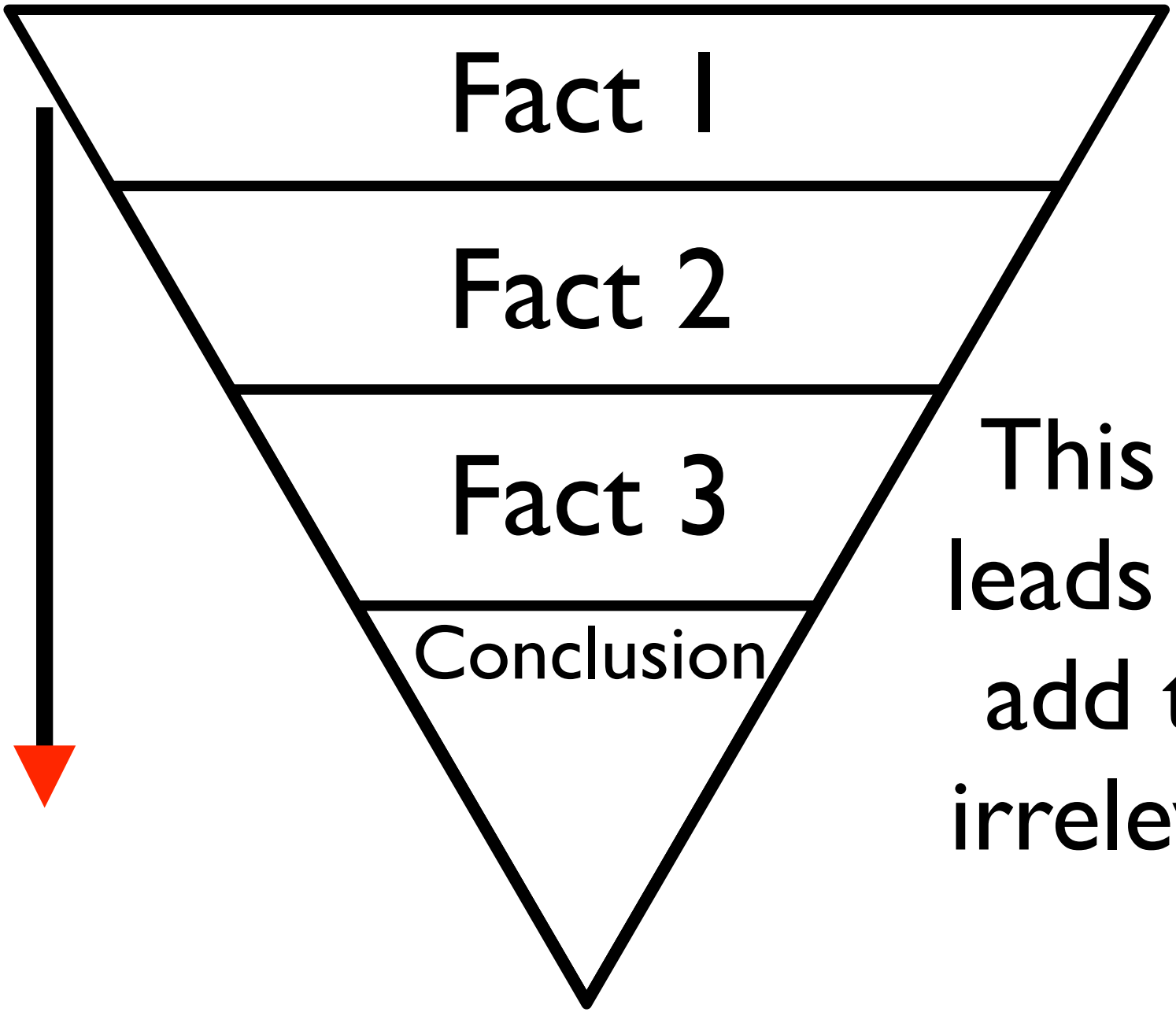


This structure favors shorter, direct sentences



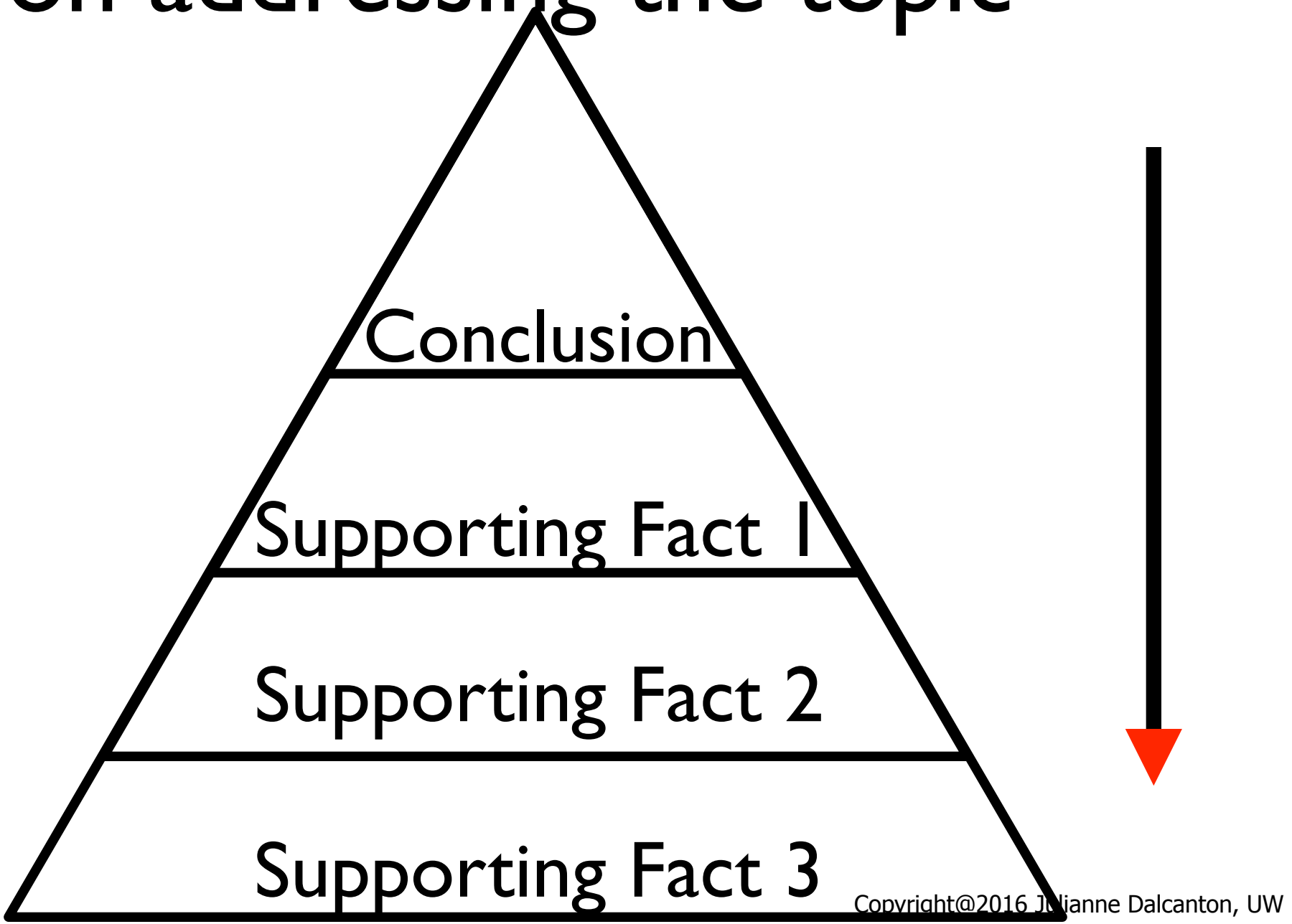
No one sentence is required to do everything.

Another, secondary problem



This structure leads writers to add too much irrelevant detail

This structure focuses the writer on addressing the topic



There is a *lot* one could say about transit spectroscopy….

The currently most productive set of indirect techniques for observing exoplanet atmospheres are those for systems where the planet transits and is eclipsed by its host star. These techniques do not require high spatial resolution, as the planet and star do not need to be spatially separated on the sky. Observations are made in the combined light of the planet and star (Figure 3-7) with the exoplanet spectrum separated out by comparison with observations of the star alone. As seen from a telescope, when the planet goes in front of the star, the starlight passes through the planet atmosphere and planet atmosphere spectral features are imprinted on the stellar spectrum. This is called transmission photometry or spectroscopy. When the planet goes behind the star, the planet disappears and reappears, adding either reflected light or thermal emission to the combined planet-star radiation. This is referred to as secondary eclipse photometry or spectroscopy.

But here, tone is kept "big picture"

Effective paragraphs show restraint, such that only *directly pertinent* information is included

For a paper, you can take as many paragraphs as you need to tell your story.

You don't have to tell the reader everything, all at once!

For a proposal, you cannot waste space, nor can you include nuance that would confuse non-experts.

You cannot burden your text with unnecessary information.

Both papers and proposals favor coherent, "single topic" paragraphs.

(Albeit for different reasons, and with different degrees of conciseness)

Example

"A basic prediction of CDM galaxy-formation models is that Milky Way-size galaxies should be surrounded by hot haloes of gas, out to their virial radii. This gas was shock-heated to the virial temperature as it accreted from the intergalactic medium. These halos may provide most of the fuel for long-term star formation in these galaxies, but their predicted properties are sensitive to the input physics, which can be constrained by the measurable properties of the gas."

"A basic prediction of CDM galaxy-formation models is that Milky Way-size galaxies should be surrounded by hot haloes of gas, out to their virial radii. This gas was shock-heated to the virial temperature as it accreted from the intergalactic medium. These halos may provide most of the fuel for long-term star formation in these galaxies, but their predicted properties are sensitive to the input physics, which can be constrained by the measurable properties of the gas."

The underlined portion is our fix from the first class.

"A basic prediction of CDM galaxy-formation models is that Milky Way-size galaxies should be surrounded by hot haloes of gas, out to their virial radii. This gas was shock-heated to the virial temperature as it accreted from the intergalactic medium. These halos may provide most of the fuel for long-term star formation in these galaxies, but their predicted properties are sensitive to the input physics, which can be constrained by the measurable properties of the gas."

Now tweak the second half before analyzing content

"A basic prediction of CDM galaxy-formation models is that Milky Way-size galaxies should be surrounded by hot haloes of gas, out to their virial radii. This gas was shock-heated to the virial temperature as it accreted from the intergalactic medium. These halos may provide most of the fuel for long-term star formation in these galaxies, but their predicted properties are sensitive to the input physics, which can be constrained by the measurable properties of the gas."

Prob #1: The "but" doesn't really make sense.

"A basic prediction of CDM galaxy-formation models is that Milky Way-size galaxies should be surrounded by hot haloes of gas, out to their virial radii. This gas was shock-heated to the virial temperature as it accreted from the intergalactic medium. These halos may provide most of the fuel for long-term star formation in these galaxies, but their predicted properties are sensitive to the input physics, which can be constrained by the measurable properties of the gas."

Prob #2: "*their predicted properties*" is ambiguous

"A basic prediction of CDM galaxy-formation models is that Milky Way-size galaxies should be surrounded by hot haloes of gas, out to their virial radii. This gas was shock-heated to the virial temperature as it accreted from the intergalactic medium. These halos may provide most of the fuel for long-term star formation in these galaxies, but their predicted properties are sensitive to the input physics, which can be constrained by the measurable properties of the gas."

Prob #3: "*In these galaxies*" is unnecessary

"A basic prediction of CDM galaxy-formation models is that Milky Way-size galaxies should be surrounded by hot haloes of gas, out to their virial radii. This gas was shock-heated to the virial temperature as it accreted from the intergalactic medium, and provides fuel for long-term star formation. The predicted properties of the gaseous halos are sensitive to the input physics, which can be constrained by the measurable properties of the gas."

Fix ambiguity, make the "*but…*" content a new sentence, and move the "*fact about gas*" back with the other "*facts about gas*"

"A basic prediction of CDM galaxy-formation models is that Milky Way-size galaxies should be surrounded by hot haloes of gas, out to their virial radii. This gas was shock-heated to the virial temperature as it accreted from the intergalactic medium, and provides fuel for long-term star formation. The predicted properties of the gaseous halos are sensitive to the input physics, which can be constrained by the measurable properties of the gas."

Better, but tweak the end of the second sentence to better connect with the beginning…

"A basic prediction of CDM galaxy-formation models is that Milky Way-size galaxies should be surrounded by hot haloes of gas, out to their virial radii. This gas was shock-heated to the virial temperature as it accreted from the intergalactic medium, and then cooled slowly, providing fuel for long-term star formation. The predicted properties of the gaseous halos are sensitive to the input physics, which can be constrained by the measurable properties of the gas."

Now, instead of being two unrelated "facts about gas", it's a linked story about thermal history

"A basic prediction of CDM galaxy-formation models is that Milky Way-size galaxies should be surrounded by hot haloes of gas, out to their virial radii. This gas was shock-heated to the virial temperature as it accreted from the intergalactic medium, and then cooled slowly, providing fuel for long-term star formation. The predicted properties of the gaseous halos are sensitive to the input physics, which can be constrained by the measurable properties of the gas."

Ok, now let's analyze the paragraph structure to look at content

"A basic prediction of CDM galaxy-formation models is that Milky Way-size galaxies should be surrounded by hot haloes of gas, out to their virial radii. This gas was shock-heated to the virial temperature as it accreted from the intergalactic medium, and then cooled slowly, providing fuel for long-term star formation. The predicted properties of the gaseous halos are sensitive to the input physics, which can be constrained by the measurable properties of the gas."

These are giving an overview of properties of gaseous halos

"A basic prediction of CDM galaxy-formation models is that Milky Way-size galaxies should be surrounded by hot haloes of gas, out to their virial radii. This gas was shock-heated to the virial temperature as it accreted from the intergalactic medium, and then cooled slowly, providing fuel for long-term star formation. The predicted properties of the gaseous halos are sensitive to the input physics, which can be constrained by the measurable properties of the gas."

Does a good job of introducing general (halos exist) before specific (thermal history of halos)

"A basic prediction of CDM galaxy-formation models is that Milky Way-size galaxies should be surrounded by hot haloes of gas, out to their virial radii. This gas was shock-heated to the virial temperature as it accreted from the intergalactic medium, and then cooled slowly, providing fuel for long-term star formation. The predicted properties of the gaseous halos are sensitive to the input physics, which can be constrained by the measurable properties of the gas."

This sentence is about predictions & measurements. It's really a new thought.

"A basic prediction of CDM galaxy-formation models is that Milky Way-size galaxies should be surrounded by hot haloes of gas, out to their virial radii. This gas was shock-heated to the virial temperature as it accreted from the intergalactic medium, and then cooled slowly, providing fuel for long-term star formation. The predicted properties of the gaseous halos are sensitive to the input physics, which can be constrained by the measurable properties of the gas."

It would be a terrific intro sentence to a new paragraph on measurements.

"A basic prediction of CDM galaxy-formation models is that Milky Way-size galaxies should be surrounded by hot haloes of gas, out to their virial radii. This gas was shock-heated to the virial temperature as it accreted from the intergalactic medium, and then cooled slowly, providing fuel for long-term star formation.

The predicted properties of the gaseous halos are sensitive to the input physics, which can be constrained by the measurable properties of the gas. For example, the mass of the gas is affected by…."