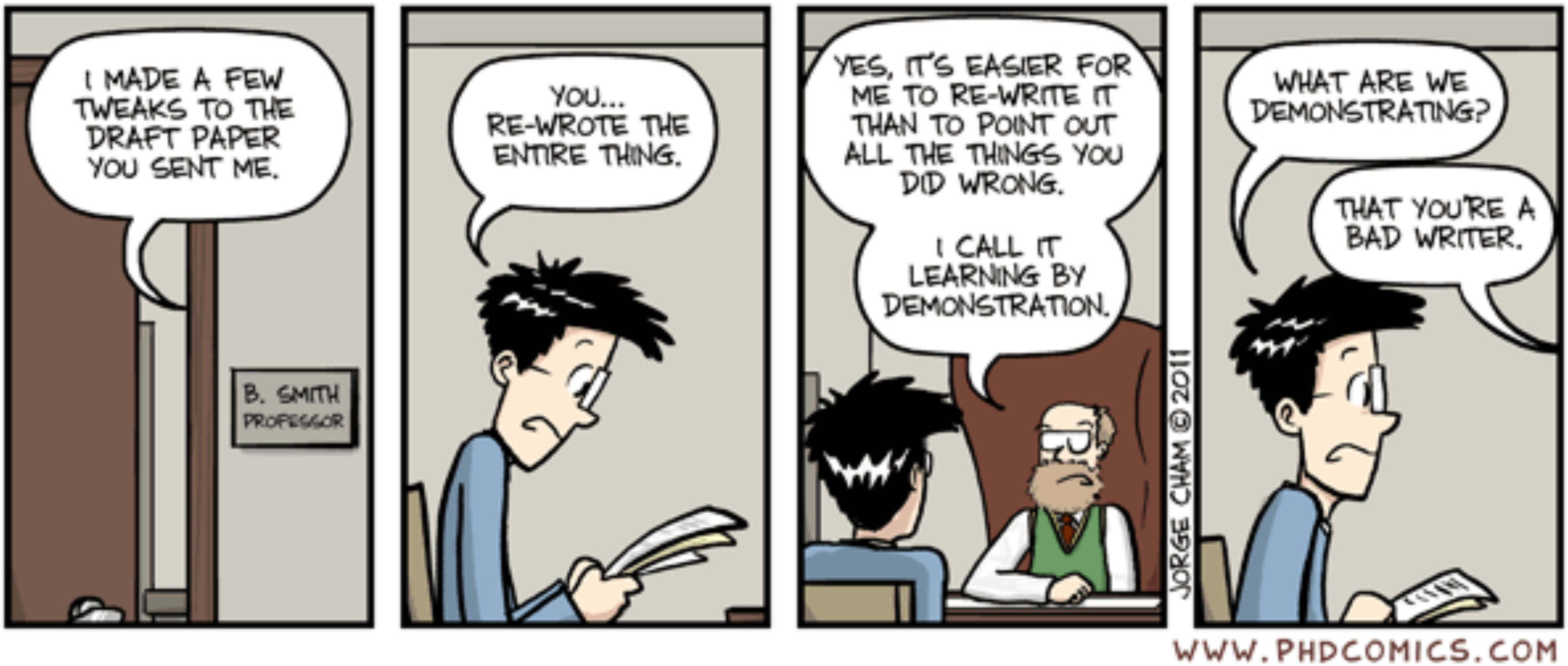
Learning to accept editing

Keep repeating:

"*It is not personal.*"

An edit is not actually a signal that the editor thinks that you, personally, are a failure.

An edit is more useful than a rewrite



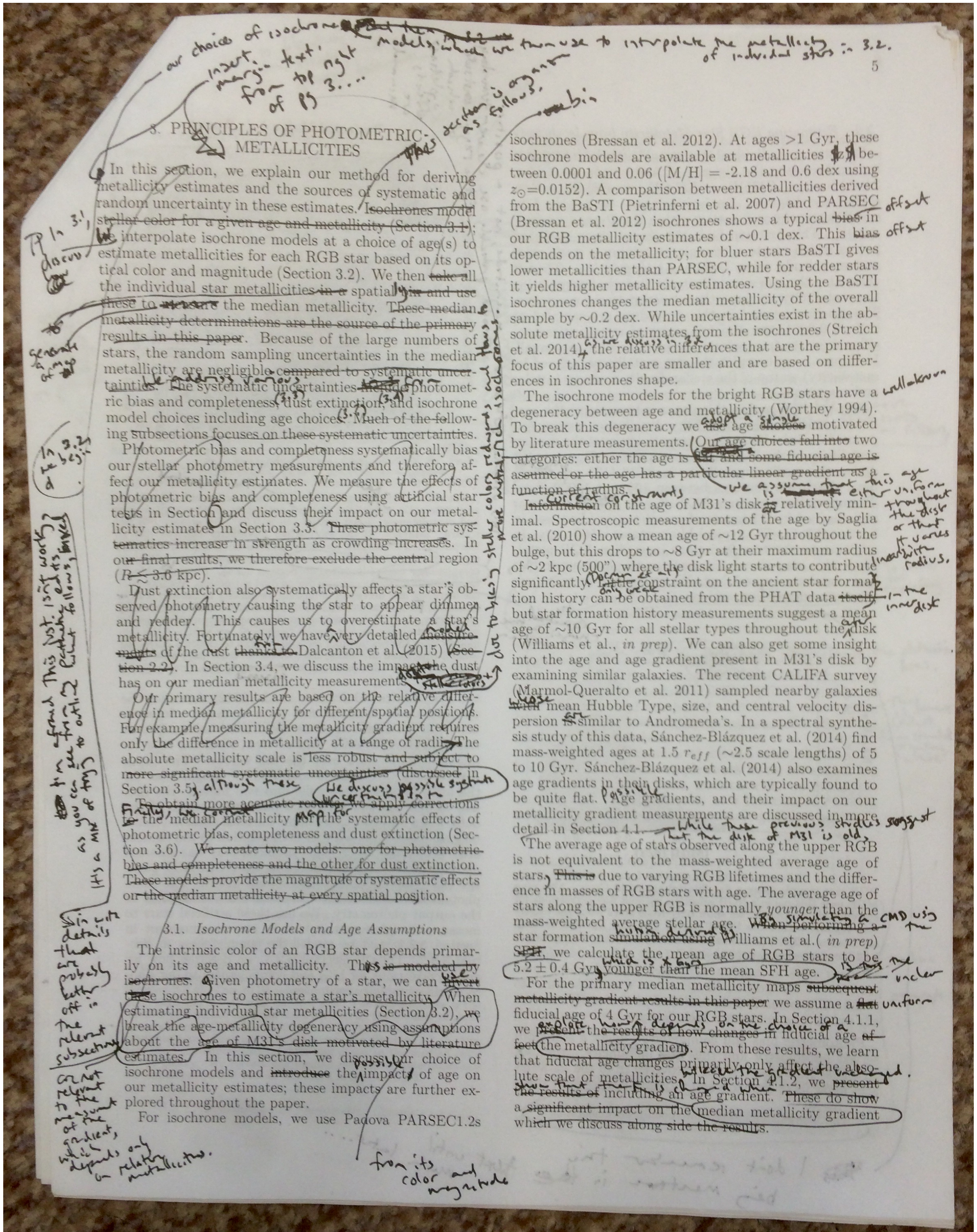
http://www.phdcomics.com/comics.php?f=1439

An edit is a signal that something *in the text* is not working as intended.

This is a *completely impersonal fact.*

A thorough edit from a collaborator is *an investment in you*.

It is a message that they believe you can fix problems, and that they want the work you care about to be the best it can be.



our choice of isochrone models, which we then use to interpolate the metallicity of individual stars in 3.2.

insert margin text from top right of p. 3...

5

3. PRINCIPLES OF PHOTOMETRIC METALLICITIES

In this section, we explain our method for deriving metallicity estimates and the sources of systematic and random uncertainty in these estimates. ~~Isochrones model stellar color for a given age and metallicity (Section 3.1);~~ We interpolate isochrone models at a choice of age(s) to estimate metallicities for each RGB star based on its optical color and magnitude (Section 3.2). We then ~~take all~~ the individual star metallicities ~~in a~~ spatial ~~bin and use these~~ to ~~measure~~ the median metallicity. ~~These median metallicity determinations are the source of the primary results in this paper.~~ Because of the large numbers of stars, the random sampling uncertainties in the median metallicity are negligible ~~compared to systematic uncertainties.~~ The systematic uncertainties ~~include~~ photometric bias and completeness, dust extinction, and isochrone model choices including age choices. ~~Much of the following subsections focuses on these systematic uncertainties.~~

Photometric bias and completeness systematically bias our stellar photometry measurements and therefore affect our metallicity estimates. We measure the effects of photometric bias and completeness using artificial star tests in Section 3.3 and discuss their impact on our metallicity estimates in Section 3.3. ~~These photometric systematics increase in strength as crowding increases.~~ In ~~our final results, we therefore exclude the central region~~ ~~($R \lesssim 3.6$ kpc).~~

Dust extinction also systematically affects a star's observed photometry causing the star to appear dimmer and redder. This causes us to overestimate a star's metallicity. Fortunately, we have very detailed ~~measurements~~ of the dust ~~thanks to~~ Dalcanton et al. (2015) ~~(Section 2.2).~~ In Section 3.4, we discuss the impact the dust has on our median metallicity measurements.

Our primary results are based on the relative difference in median metallicity for different spatial positions. For example, measuring the metallicity gradient requires only the difference in metallicity at a range of radii. The absolute metallicity scale is less robust ~~and subject to more significant systematic uncertainties~~ (discussed in Section 3.5). ~~To obtain more accurate results, we apply corrections~~ to the median metallicity for the systematic effects of photometric bias, completeness and dust extinction (Section 3.6). ~~We create two models: one for photometric bias and completeness and the other for dust extinction. These models provide the magnitude of systematic effects on the median metallicity at every spatial position.~~

3.1. Isochrone Models and Age Assumptions

The intrinsic color of an RGB star depends primarily on its age and metallicity. This ~~is modeled by isochrones.~~ Given photometry of a star, we can ~~invert these~~ isochrones to estimate a star's metallicity. When estimating individual star metallicities (Section 3.2), we break the age-metallicity degeneracy using assumptions about the age of M31's disk motivated by literature estimates. In this section, we discuss our choice of isochrone models and ~~introduce~~ the impacts of age on our metallicity estimates; these impacts are further explored throughout the paper.

For isochrone models, we use Padova PARSEC1.2s isochrones (Bressan et al. 2012). At ages >1 Gyr, these isochrone models are available at metallicities ~~Z~~ between 0.0001 and 0.06 ([M/H] = -2.18 and 0.6 dex using $z_\odot$=0.0152). A comparison between metallicities derived from the BaSTI (Pietrinferni et al. 2007) and PARSEC (Bressan et al. 2012) isochrones shows a typical ~~bias~~ in our RGB metallicity estimates of ~0.1 dex. This ~~bias~~ depends on the metallicity; for bluer stars BaSTI gives lower metallicities than PARSEC, while for redder stars it yields higher metallicity estimates. Using the BaSTI isochrones changes the median metallicity of the overall sample by ~0.2 dex. While uncertainties exist in the absolute metallicity estimates from the isochrones (Streich et al. 2014), the relative differences that are the primary focus of this paper are smaller and are based on differences in isochrones shape.

The isochrone models for the bright RGB stars have a degeneracy between age and metallicity (Worthey 1994). To break this degeneracy we ~~use~~ age ~~choices~~ motivated by literature measurements. ~~Our age choices fall into two categories: either the age is flat and some fiducial age is assumed or the age has a particular linear gradient as a function of radius.~~

Information on the age of M31's disk is relatively minimal. Spectroscopic measurements of the age by Saglia et al. (2010) show a mean age of ~12 Gyr throughout the bulge, but this drops to ~8 Gyr at their maximum radius of ~2 kpc (500") where the disk light starts to contribute significantly. Little constraint on the ancient star formation history can be obtained from the PHAT data ~~itself~~, but star formation history measurements suggest a mean age of ~10 Gyr for all stellar types throughout the disk (Williams et al., *in prep*). We can also get some insight into the age and age gradient present in M31's disk by examining similar galaxies. The recent CALIFA survey (Marmol-Queralto et al. 2011) sampled nearby galaxies ~~with~~ mean Hubble Type, size, and central velocity dispersion ~~is~~ similar to Andromeda's. In a spectral synthesis study of this data, Sánchez-Blázquez et al. (2014) find mass-weighted ages at 1.5 r_{eff} (~2.5 scale lengths) of 5 to 10 Gyr. Sánchez-Blázquez et al. (2014) also examines age gradients in their disks, which are typically found to be quite flat. Age gradients, and their impact on our metallicity gradient measurements are discussed in more detail in Section 4.1.

The average age of stars observed along the upper RGB is not equivalent to the mass-weighted average age of stars. ~~This is~~ due to varying RGB lifetimes and the difference in masses of RGB stars with age. The average age of stars along the upper RGB is normally *younger* than the mass-weighted average stellar age. When performing a star formation ~~simulation using~~ Williams et al.(*in prep*) ~~SFH~~, we calculate the mean age of RGB stars to be 5.2 ± 0.4 Gyr, younger than the mean SFH age.

For the primary median metallicity maps ~~subsequent metallicity gradient results in this paper~~ we assume a ~~flat~~ fiducial age of 4 Gyr for our RGB stars. In Section 4.1.1, we ~~present~~ the ~~results of how changes in~~ fiducial age ~~affect~~ the metallicity gradient. From these results, we learn that fiducial age changes primarily only affect the absolute scale of metallicities. In Section 4.1.2, we ~~present the results of~~ including an age gradient. ~~These do show a significant impact on the~~ median metallicity gradient ~~which we discuss along side the results.~~

Edits are less alarming in double-spaced preprint form…

A thorough edit is a *teaching device*.

write

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

When you ignore a collaborator’s edit?

You are in denial.

There was something wrong with the text and they tried to help. But you essentially said “No. It’s perfect. You read it wrong.”

When you ignore a collaborator's edit?

You are in denial.

You may not agree with their fix, but you cannot ignore that the text was not working.

Ways to make a collaborator’s edit more constructive

Try to understand what problem they’re fixing.

Sometimes they’ll tell you, but after this class, you may be able to deduce what’s being corrected

Ways to make a collaborator’s edit more constructive

Pay close attention to repeated fixes

When you find the 4th instance of splitting a long sentence, or of turning a demonstrative noun into an adjective, or of crossing out semicolons, *take the hint*!

Ways to make a collaborator's edit more constructive

Ask for what you really need

You can request help with:

Overall structure
Effectiveness of an argument
Flagging missing information
Flagging excess detail
Flagging text that's not working

Overall structure

Effectiveness of an argument

Flagging missing information

Flagging excess detail

Finding text that's not working

These are usually faster to fix than a detailed language edit.

Overall structure

Effectiveness of an argument

The first two are problems you want to know about *early*.

Don't agonize over text that may need to be restructured

Overall structure
Effectiveness of an argument

These issues are often the root cause of difficulty writing a particular document.

Don’t wait to ask for input.

The most important issue for any paper:

Framing the story you want to tell

Key: What's your story?

Good fiction is always rooted in a conflict.

A protagonist faces a conflict, and the nature of both makes the subsequent plot inevitable

Good papers have stories

There is a conflict of ideas, and your work should appear as the inevitable way to resolve the questions raised by the conflict.

The story *doesn't* have to be the one you originally set out to tell

The choice of story is often best done at the *end* of the project.

Look at your stack of results & associated plots

Which are the most important? What issue does the most important ones resolve?

That's your story*.

*even if it's not the one you thought you were telling….

How specific should your story be?

Specific enough that your work is the obvious answer

Example:

Your result: *Molecular cores in the Monoceros molecular cloud have a power-law mass distribution with a slope similar to the IMF.*

Your result: *Molecular cores in the Monoceros molecular cloud have a power-law mass distribution with a slope similar to the IMF.*

Possible story:
"How do stars form?"

This is *way* too general.

Your result: *Molecular cores in the Monoceros molecular cloud have a power-law mass distribution with a slope similar to the IMF.*

Possible story:
“What is the substructure within molecular clouds?”

Better, but not compelling.
“Substructure” is not interesting without context.

Your result: *Molecular cores in the Monoceros molecular cloud have a power-law mass distribution with a slope similar to the IMF.*

Possible story:

"Is the substructure within molecular clouds driven by compressive or solenoidal forcing?"

Better, because there's now a clear question to be answered (assuming that your measurement answers it!)

Your result: *Molecular cores in the Monoceros molecular cloud have a power-law mass distribution with a slope similar to the IMF.*

Possible story:
"What is the origin of the IMF?"

Important to a wide audience, and directly relevant to your measurements

In each case, your introduction would be wildly different

"How do stars form?"

"Is the substructure within molecular clouds driven by compressive or solenoidal forcing?"

"What is the origin of the IMF?"

In each case, your introduction would be wildly different

"How do stars form?"

This would likely become a long book report with many details about stages of star formation

In each case, your introduction would be wildly different

"Is the substructure within molecular clouds driven by compressive or solenoidal forcing?"

This would focus on issues of turbulence, magnetic fields, and gravitational collapse*

*And maybe, if you hadn't gotten a power-law with the proper IMF slope, this would have been the right story!

In each case, your introduction would be wildly different

"What is the origin of the IMF?"

This would focus on how molecular cloud properties could set stellar mass distributions, which is directly testable with your observations

If you *don't* know your story:

1. It's nearly impossible to write a compelling introduction

2. The rest of the text will lack momentum & purpose

If you *do* know your story:

You have a clear metric for deciding what goes in or out of the paper, and in what order

If you *do* know your story:

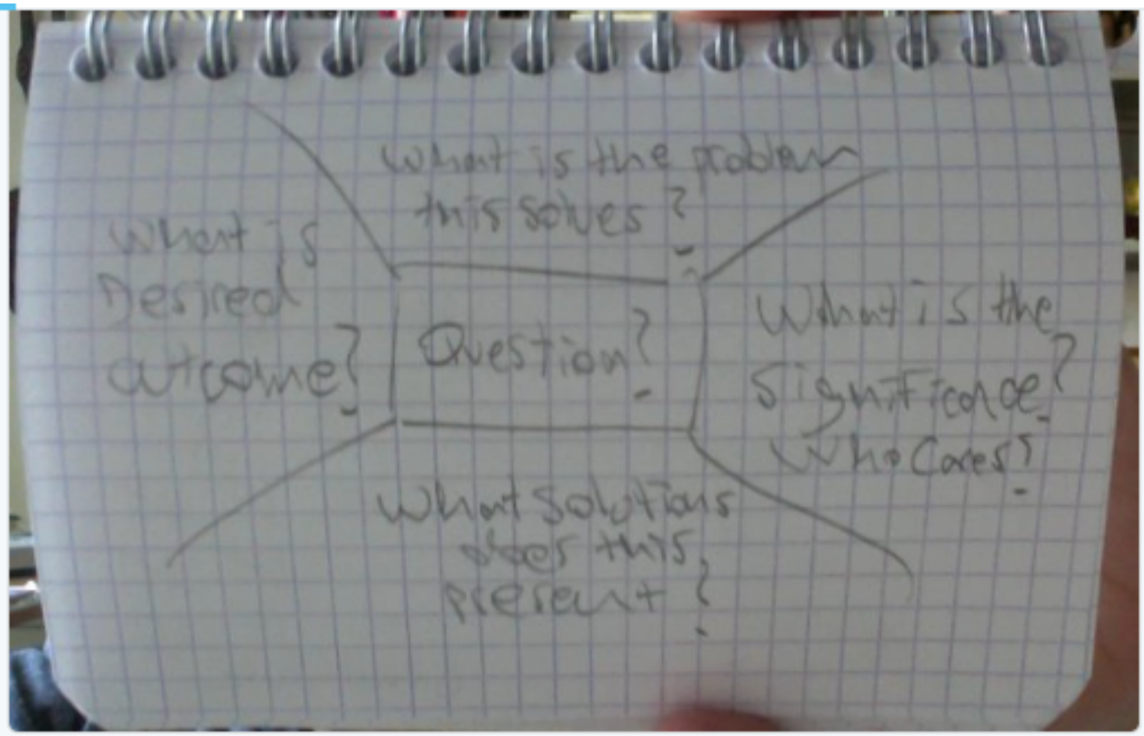
You also have a framework to guide your reader

All new material can be discussed in the context of how it supports or contradicts the story.

How do you figure out your story?

- Write down a ~2 sentence description.
- Discuss your pitch with collaborators.
- Evaluate whether your result is direct, compelling outcome of that story.
- Re-evaluate as you write & read.
- If placing your result in the story feels like a stretch, your story may be too broad, or focused on the wrong idea.

How do you figure out your story?



4

Namnezia @Namnezia · 16h

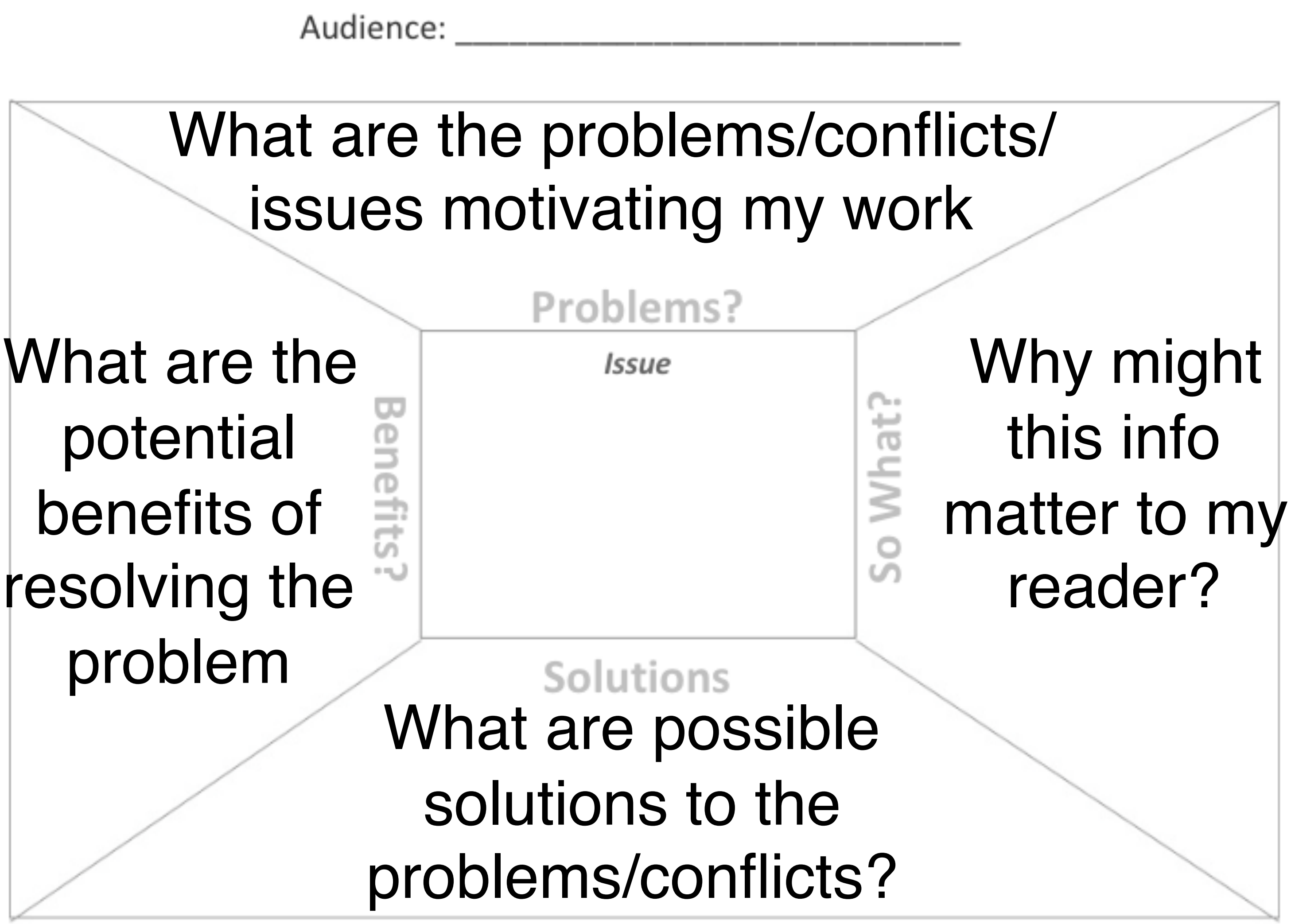
I used this diagram scheme to write my last paper, worked really well. Can't remember what it was called.

1

Namnezia @Namnezia · 17h

Anyone remember what a kind of project map is called where you state question in center, surround by 4 Q's: problem, signif, action,future?

“COMPASS Message Box”



http://compassblogs.org/blog/2013/06/20/getting-to-the-so-what-of-your-science/

https://www.scribd.com/doc/139351833/The-COMPASS-Message-Box

How do you figure out your story?

Don’t be afraid to sell the relevance of your work!

It’s ok to be excited about your work’s impact*

*if you’re not, who will?

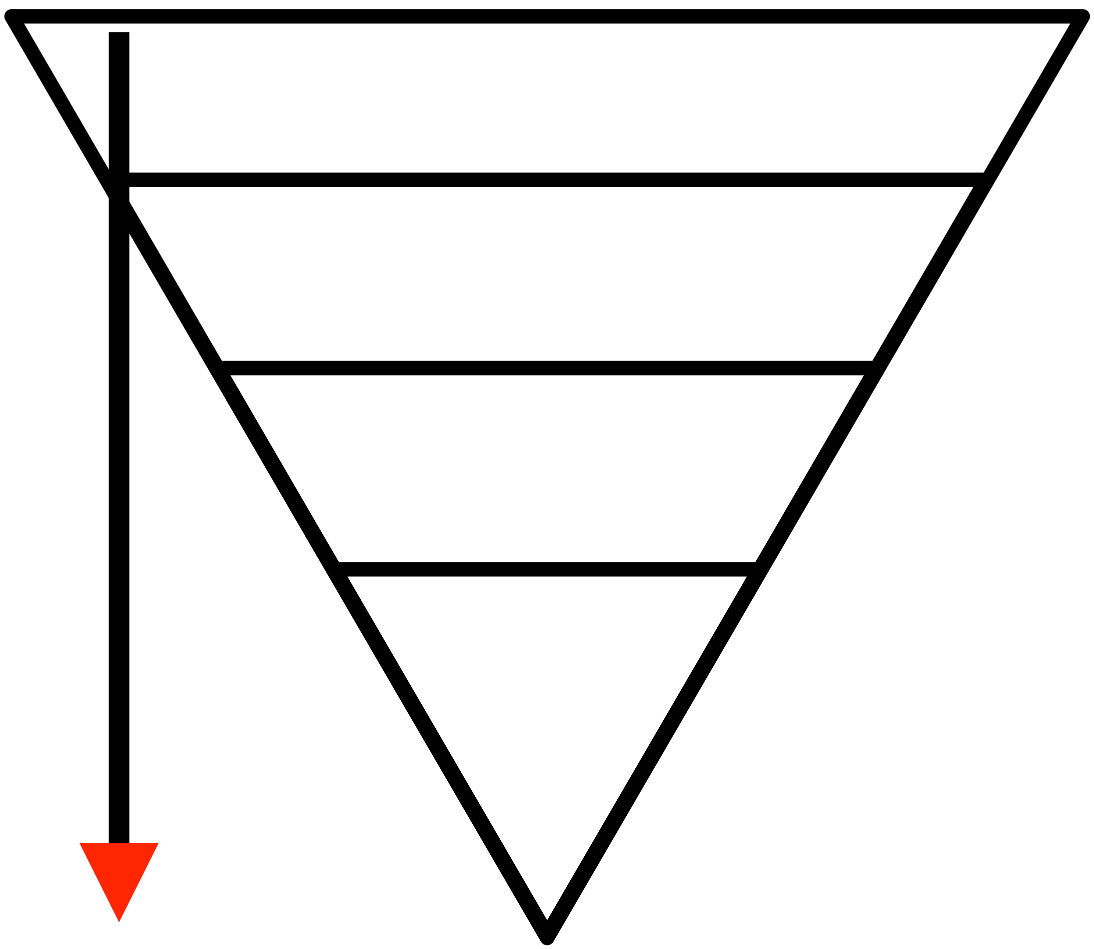
How do you figure out your story?

That said, don’t oversell the strength of the result.

If it’s only a marginal result/ correlation, it doesn’t look good to overstate it.

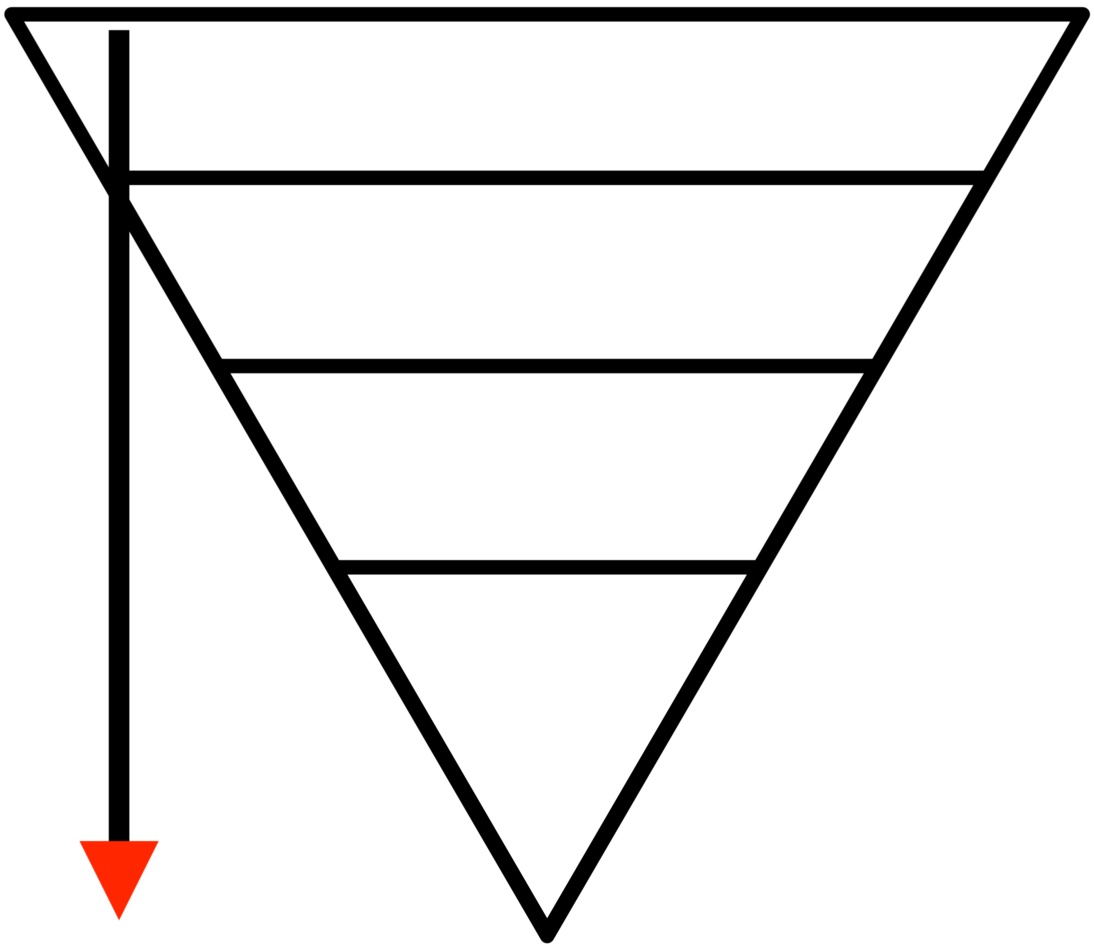
Your story is first framed in the introduction

Framing the story in the introduction



Move from the largest context, to the specific details of the paper

Introduction



How general you start with depends on the venue

Previous example:

Your result: *Molecular cores in the Monoceros molecular cloud have a power-law mass distribution with a slope similar to the IMF.*

Possible story:
"What is the origin of the IMF?"

Important to a wide audience, and directly relevant to your measurements

The initial mass function (IMF) of stars has impacts throughout astronomy.

In spite of its importance, remarkably little is understood about its origin.

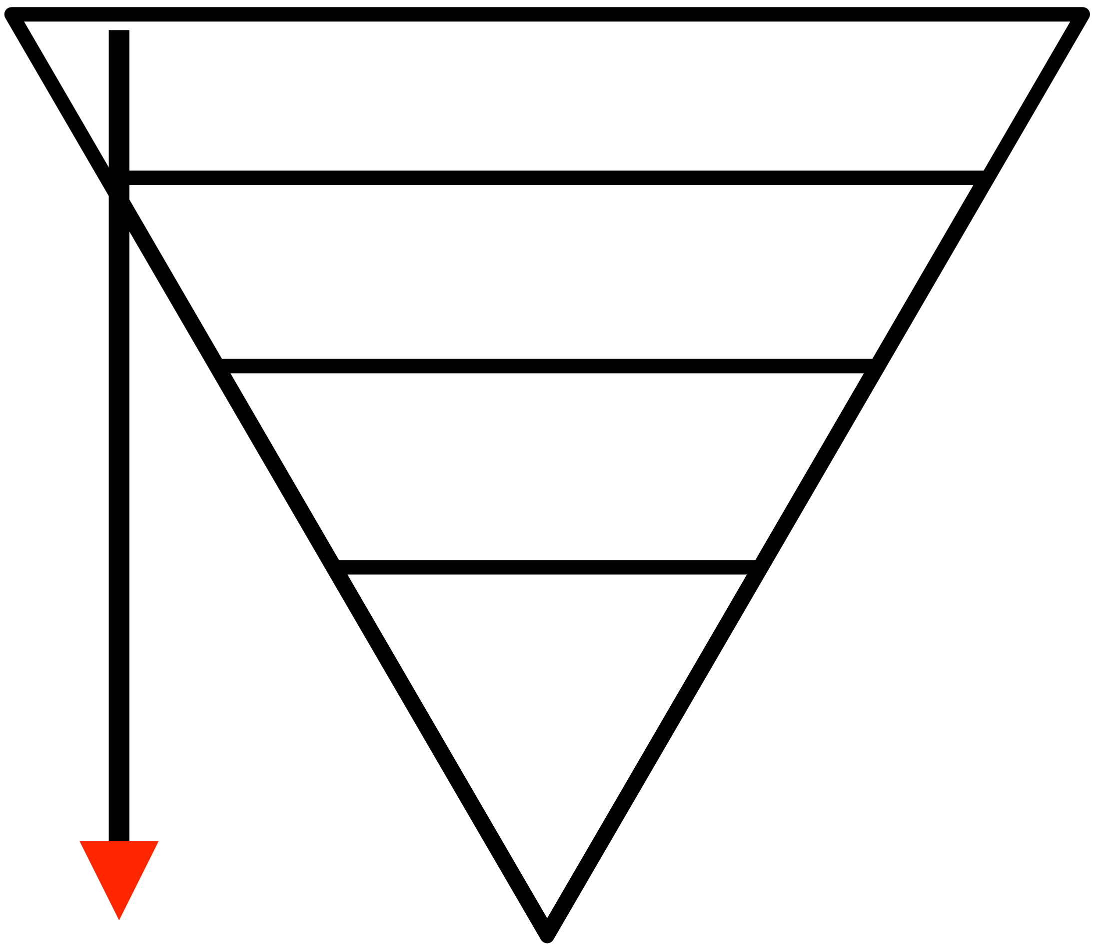
Theoretical explanations abound, but no concensus

Some theories are based on properties of the molecular clouds from which stars form.

We test these predictions

You would add a layer on top of this for a non-astronomer audience

Introduction



You should get through these stages fairly rapidly, to shift focus to your real story.

The initial mass function (IMF) of stars has impacts throughout astronomy.

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Some theories are based on properties of the molecular clouds from which stars form.

We test these predictions

This could be a single paragraph

The initial mass function (IMF) of stars has impacts throughout astronomy.

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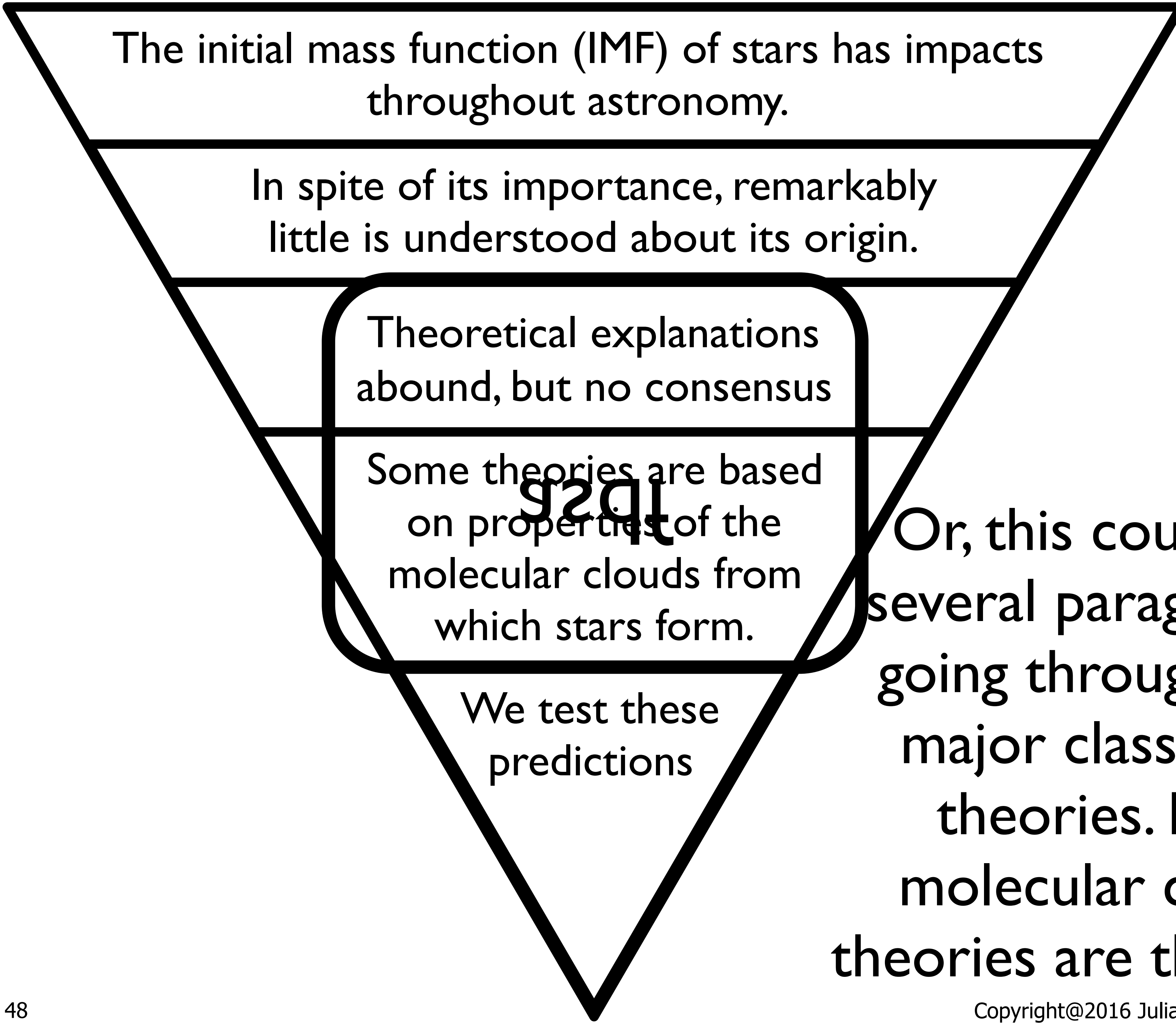
Theoretical explanations abound, but no consensus

Some theories are based on properties of the molecular clouds from which stars form.

We test these predictions

Or, these could be two, where the second paragraph maybe introduced general classes of theories.



Or, this could be several paragraphs, going through the major classes of theories. But, molecular cloud theories are the goal!

The initial mass function (IMF) of stars has impacts throughout astronomy.

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Theoretical explanations abound, but no consensus

Some theories are based on properties of the molecular clouds from which stars form.

We test these predictions

Don't just dive in and start describing every paper! Do the work of synthesis & classification for the reader!

The initial mass function (IMF) of stars has impacts throughout astronomy.

In spite of its importance, remarkably little is understood about its origin.

Theoretical explanations abound, but no consensus

Some theories are based on properties of the molecular clouds from which stars form.

We test these predictions

"There are two major classes of theories: those in which feedback from forming stars controls the eventual mass function, and those in which the IMF is a direct result of conditions in the nascent molecular cloud,"

The initial mass function (IMF) of stars has impacts throughout astronomy.

In spite of its importance, remarkably little is understood about its origin.

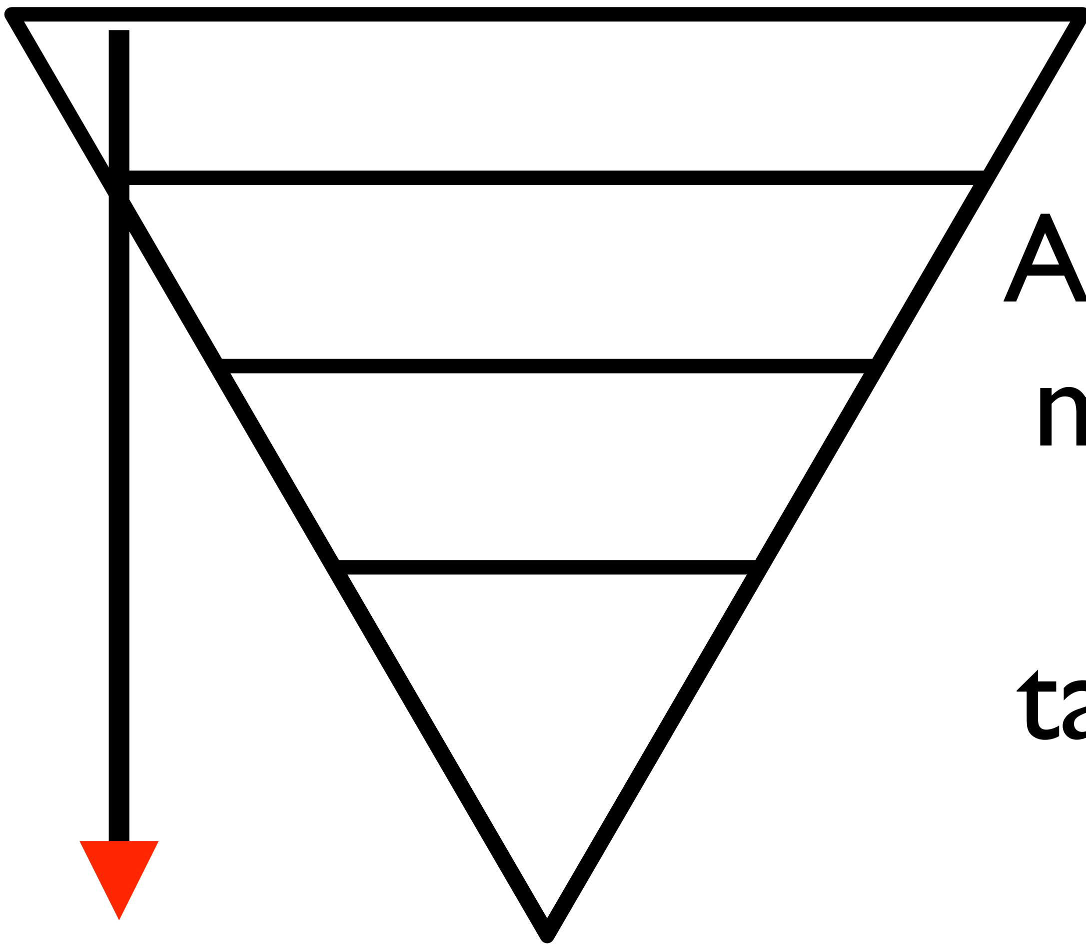
Theoretical explanations abound, but no consensus

Some theories are based on properties of the molecular clouds from which stars form.

We test these predictions

After this, you could go into details of a few representative models that set up a clear contrast of expectations, which then makes your measurement look like an obvious test and/or discriminant among models.

Introduction



Caution:
Are you leading with multiple paragraphs that have only tangential impact on your story?

The reader will give "weight" to what you spend significant time discussing.

Don't write too much about "stepping stones" on your way to the true story.

It is ok to simply "assert" importance in a sentence or two, along with a link to a review article.

The initial mass function (IMF) of stars has impacts throughout astronomy.

In spite of its importance, remarkably little is understood about its origin.

Theoretical explanations abound, but no concensus

Some theories make clear predictions about the molecular clouds from which stars form.

We test these predictions

Yes

"It affects features as diverse as the abundance of elements, the SN rate, and the numbers of brown dwarfs (Bastian et al 2010)."

No

Three paragraphs discussing the impact of the IMF on various fields of astronomy.

Same issue holds deeper into the introduction

The initial mass function (IMF) of stars has impacts throughout astronomy.

In spite of its importance, remarkably little is understood about its origin.

Theoretical explanations abound, but no concensus

Some theories make clear predictions about the molecular clouds from which stars form.

We test these predictions

Yes

High level, structured discussion of key theoretical approaches that leads quickly to "theories related to molecular clouds"

No

Multiple paragraph book report on "every theory for the origin of the IMF."

Heard describes this structure as:

- Define a "research territory" (i.e., context)

  IMF

- Define a "niche" within that territory (i.e., knowledge gap)

  Does the IMF emerge from features imprinted in the host molecular cloud?

- Occupy that niche (i.e., how will you fill that gap)

  We measured the mass function of cores.

Note: Proposals are *exactly* the same.

- Define a “research territory” (i.e., context)

  IMF

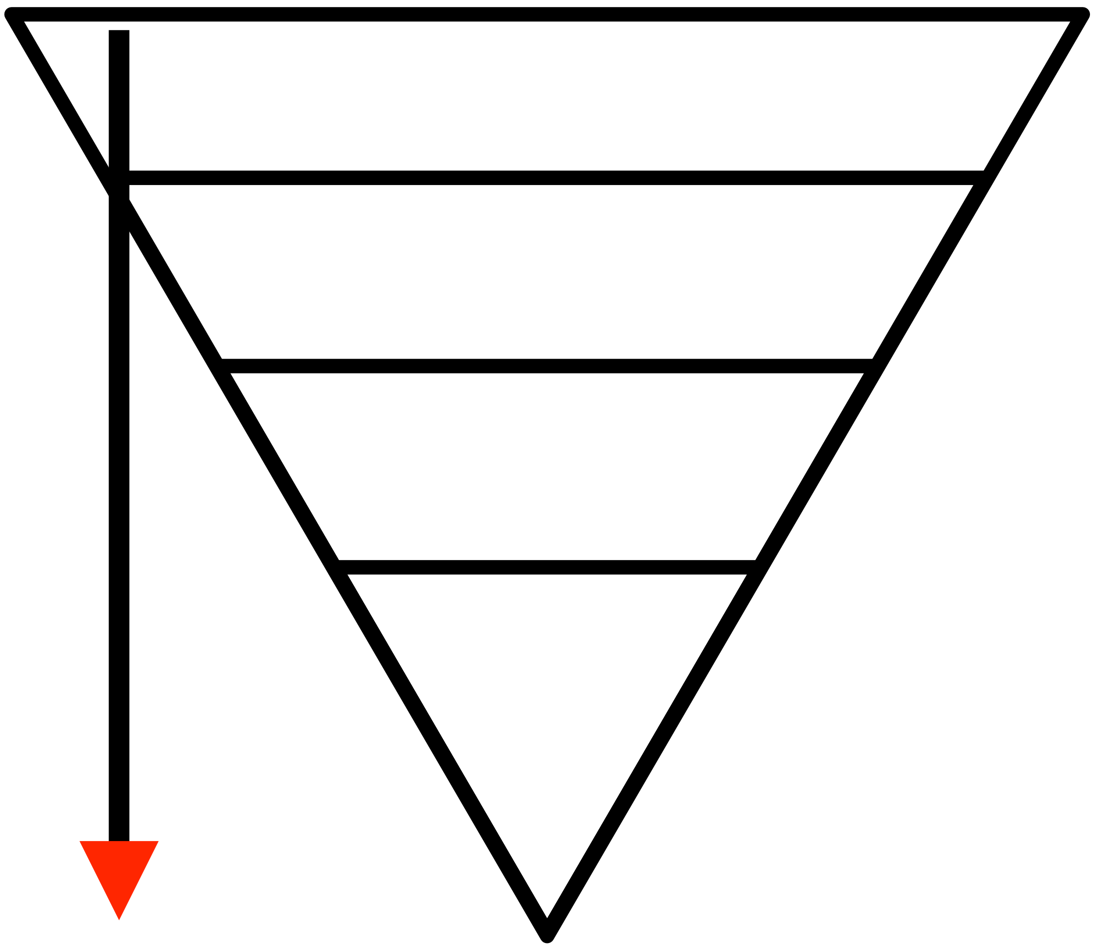
- Define a “niche” within that territory (i.e., knowledge gap)

  Does the IMF emerge from features imprinted in the host molecular cloud?

- Occupy that niche (i.e., how will you fill that gap)

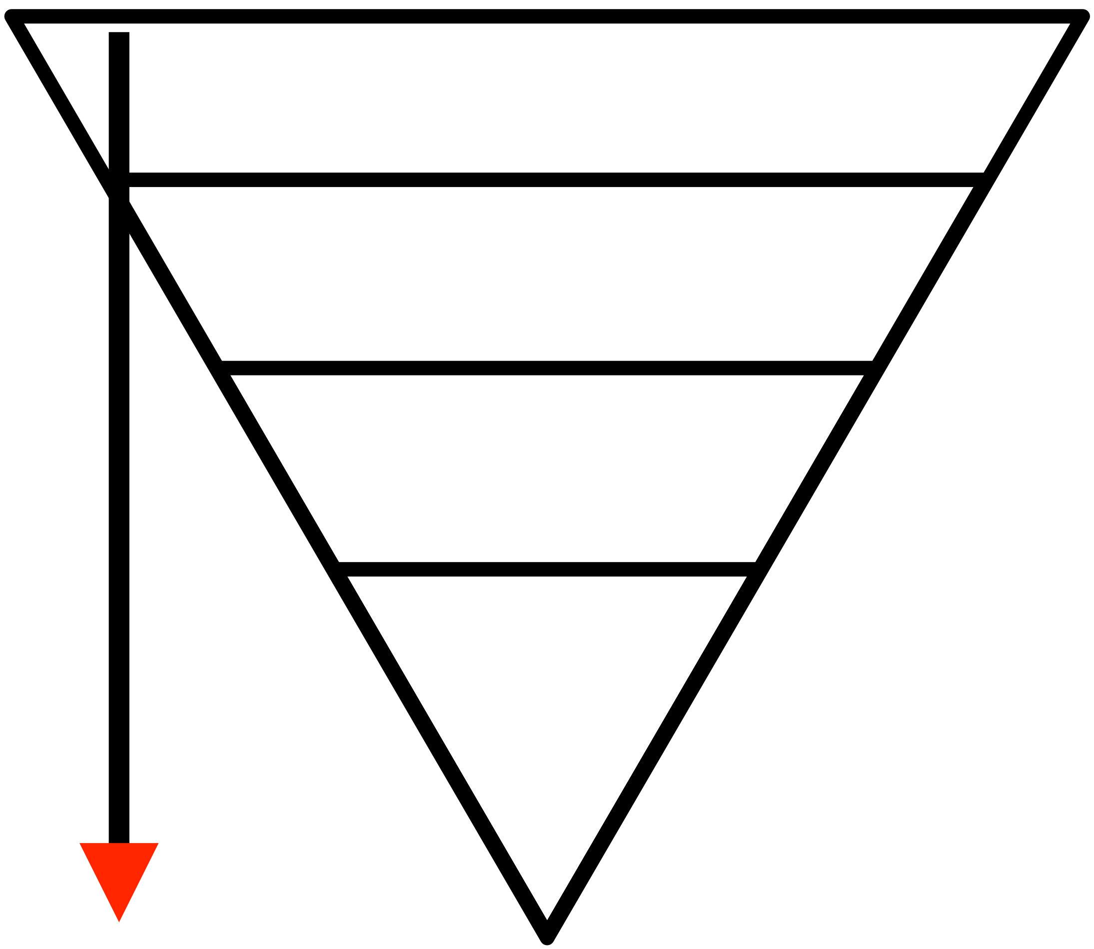
  We will measure the mass function of cores.

Structuring the Introduction



From last time: Move from the largest context, to the specific details of the paper

Structuring the Introduction



Intro should set up the structure of the paper

Overall Paper Structure

“OCAR” from “Writing Science*”

Josh Schimel

- Opening
- Challenge
- Action
- Resolution

*Much of today’s class is drawn from this book

- Opening
- Challenge
- Action
- Resolution

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?

- Opening
- Challenge
- Action
- Resolution

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?

- Opening
- Challenge
- Action
- Resolution

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; in a proposal, it describes the work you hope to do.

- Opening
- Challenge
- Action
- Resolution

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; in a proposal, it describes the work you hope to do.

Resolution (R): How have the characters and their world changed as a result of the action? This is your conclusion—what did you learn from your work?

Good for research papers

- Opening
- Challenge
- Action
- Resolution

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; in a proposal, it describes the work you hope to do.

Resolution (R): How have the characters and their world changed as a result of the action? This is your conclusion—what did you learn from your work?

But, other structures can work for proposals or writing for outreach

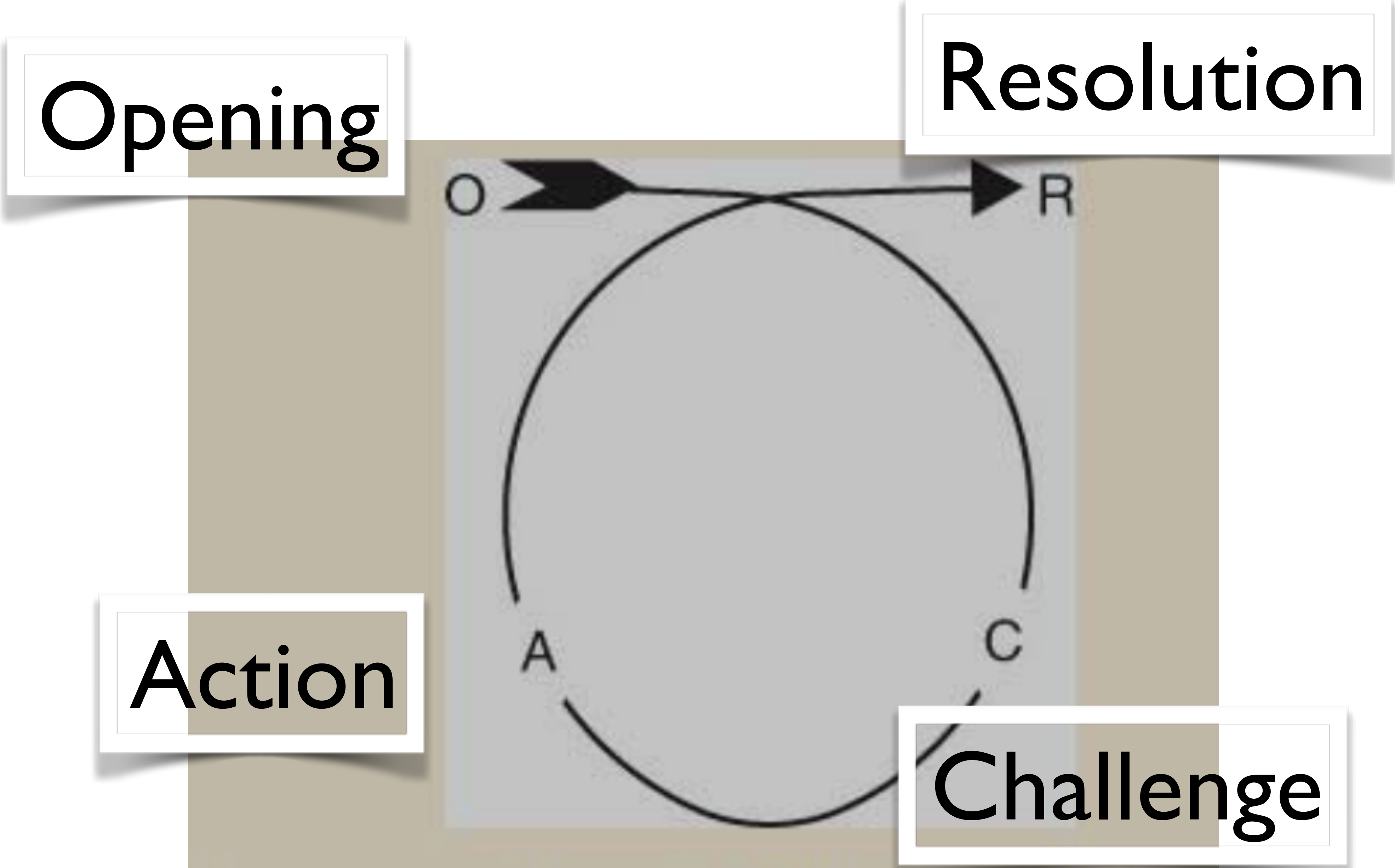


Figure 4.1. How an OCAR story makes a spiral: the story comes back to its starting point, but that point has moved.

In typical research papers:

- Opening
- Challenge

Introduction

- Action
- Resolution

In typical research papers:

- Opening
- Challenge
- Action Methods/Analysis
- Resolution

In typical research papers:

- Opening
- Challenge
- Action
- Resolution

Discussion/
Conclusion

The Opening

- Opening
- Challenge
- Action
- Resolution

First sentence and/or paragraph can frame entire paper, when done well.

The Opening

Let’s compare two papers’ content (via their abstracts) to their choice of opening paragraphs.

An effective opening: Paper content

AFTER THE FALL: THE DUST AND GAS IN E+A POST-STARBURST GALAXIES

A. Smercina[1,2], J.D.T. Smith[2,3], D.A. Dale[4], K.D. French[5,6,#], K.V. Croxall[7], S. Zhukovska[8], A. Togi[9], E.F. Bell[1], A.F. Crocker[10], B.T. Draine[11], T.H. Jarrett[12], C. Tremonti[13], Yujin Yang[14], A.I. Zabludoff[6]

ABSTRACT

The traditional picture of post-starburst galaxies as dust- and gas-poor merger remnants, rapidly transitioning to quiescence, has been recently challenged. Unexpected detections of a significant ISM in many post-starbursts raise important questions. Are they truly quiescent and, if so, what mechanisms inhibit further star formation? What processes dominate their ISM energetics? We present an infrared spectroscopic and photometric survey of 33 SDSS-selected E+A post-starbursts, aimed at resolving these questions. We find compact, warm dust reservoirs with high PAH abundances, and total gas and dust masses significantly higher than expected from stellar recycling alone. Both PAH/TIR and dust-to-burst stellar mass ratios are seen to decrease with post-burst age, indicative of the accumulating effects of dust destruction and an incipient transition to hot, early-type ISM properties. Their infrared spectral properties are unique, with dominant PAH emission, very weak nebular lines, unusually strong H_2 rotational emission, and deep [C II] deficits. There is substantial scatter among SFR indicators, and both PAH and TIR luminosities provide overestimates. Even as potential upper limits, all tracers show that the SFR has typically experienced a more than two order-of-magnitude decline since the starburst, and that the SFR is considerably lower than expected given both their stellar masses and molecular gas densities. These results paint a coherent picture of systems in which star formation was, indeed, rapidly truncated, but in which the ISM was *not* completely expelled, and is instead supported against collapse by latent or continued injection of turbulent or mechanical heating. The resulting aging burst populations provide a "high-soft" radiation field which seemingly dominates the E+As' unusual ISM energetics.

 http://xxx.lanl.gov/pdf/1802.04798

The effective opening paragraph:

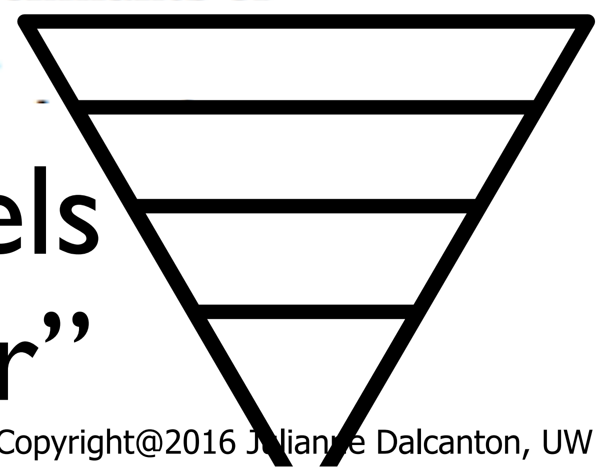
AFTER THE FALL: THE DUST AND GAS IN E+A POST-STARBURST GALAXIES

1. INTRODUCTION

Once thought to be a simple evolutionary sequence, the pathways leading galaxies from the star-forming blue cloud to the quiescent red sequence have been revealed to be incredibly diverse (Barro et al. 2014; Schawinski et al. 2014). The cessation of star formation appears to happen on vastly different timescales, strongly dependent on a galaxy's growth history (Martin et al. 2007). A class of unique objects called post-starbursts galaxies (PSBs) appear to be the remnants of the most violent of such "quenching" events.

http://xxx.lanl.gov/pdf/1802.04798

Note how efficiently it funnels down to the main "character"



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AFTER THE FALL: THE DUST AND GAS IN E+A POST-STARBURST GALAXIES

1. INTRODUCTION

Once thought to be a simple evolutionary sequence, the pathways leading galaxies from the star-forming blue cloud to the quiescent red sequence have been revealed to be incredibly diverse (Barro et al. 2014; Schawinski et al. 2014). The cessation of star formation appears to happen on vastly different timescales, strongly dependent on a galaxy's growth history (Martin et al. 2007). A class of unique objects called post-starbursts galaxies (PSBs) appear to be the remnants of the most violent of such "quenching" events.

http://xxx.lanl.gov/pdf/1802.04798

Note the hooks: "unique", "most violent"

The effective opening paragraph:

AFTER THE FALL: THE DUST AND GAS IN E+A POST-STARBURST GALAXIES

1. INTRODUCTION

Once thought to be a simple evolutionary sequence, the pathways leading galaxies from the star-forming blue cloud to the quiescent red sequence have been revealed to be incredibly diverse (Barro et al. 2014; Schawinski et al. 2014). The cessation of star formation appears to happen on vastly different timescales, strongly dependent on a galaxy's growth history (Martin et al. 2007). A class of unique objects called post-starbursts galaxies (PSBs) appear to be the remnants of the most violent of such "quenching" events.

http://xxx.lanl.gov/pdf/1802.04798

Opening sentence is also a good hook: suggests a rapidly-evolving subfield that yields surprises.

A less effective opening: Paper content

ABSTRACT

By analysing a sample of galaxies selected from the HI Parkes All Sky Survey (HIPASS) to contain more than 2.5 times their expected HI content based on their optical properties, we investigate what drives these HI eXtreme (HIX) galaxies to be so HI-rich. We model the H I kinematics with the *T*ilted *R*ing *F*itting *C*ode TiRiFiC and compare the observed HIX galaxies to a control sample of galaxies from HIPASS as well as simulated galaxies built with the semi-analytic model DARK SAGE. We find that (1) H I discs in HIX galaxies are more likely to be warped and more likely to host H I arms and tails than in the control galaxies, (2) the average H I and average stellar column density of HIX galaxies is comparable to the control sample, (3) HIX galaxies have higher H I and baryonic specific angular momenta than control galaxies, (4) most HIX galaxies live in higher-spin haloes than most control galaxies. These results suggest that HIX galaxies are H I-rich because they can support more H I against gravitational instability due to their high specific angular momentum. The majority of the HIX galaxies inherits their high specific angular momentum from their halo. The H I content of HIX galaxies might be further increased by gas-rich minor mergers.

FYI, this paper has nice results. I'm only quibbling with presentation choices.

The less effective opening paragraph

1 INTRODUCTION

The gaseous and stellar content of galaxies is tightly related through the galactic gas cycle. Atomic hydrogen (H I) condenses to form molecular gas (H_2) clouds. These clouds are the birth places of stars. When comparing the amount of available H I to the current star formation rate in local galaxies, Kennicutt (1998) and Schiminovich et al. (2010) find that their H I reservoirs would be consumed within ≈ 2 Gyr. Hence, galaxies need to replenish their gas reservoir in order to remain active starformers in the future (Sancisi et al. 2008, Sánchez Almeida et al. 2014 and references therein).

Has the "main character" been introduced?
Would you guess it correctly?

The less effective opening paragraph

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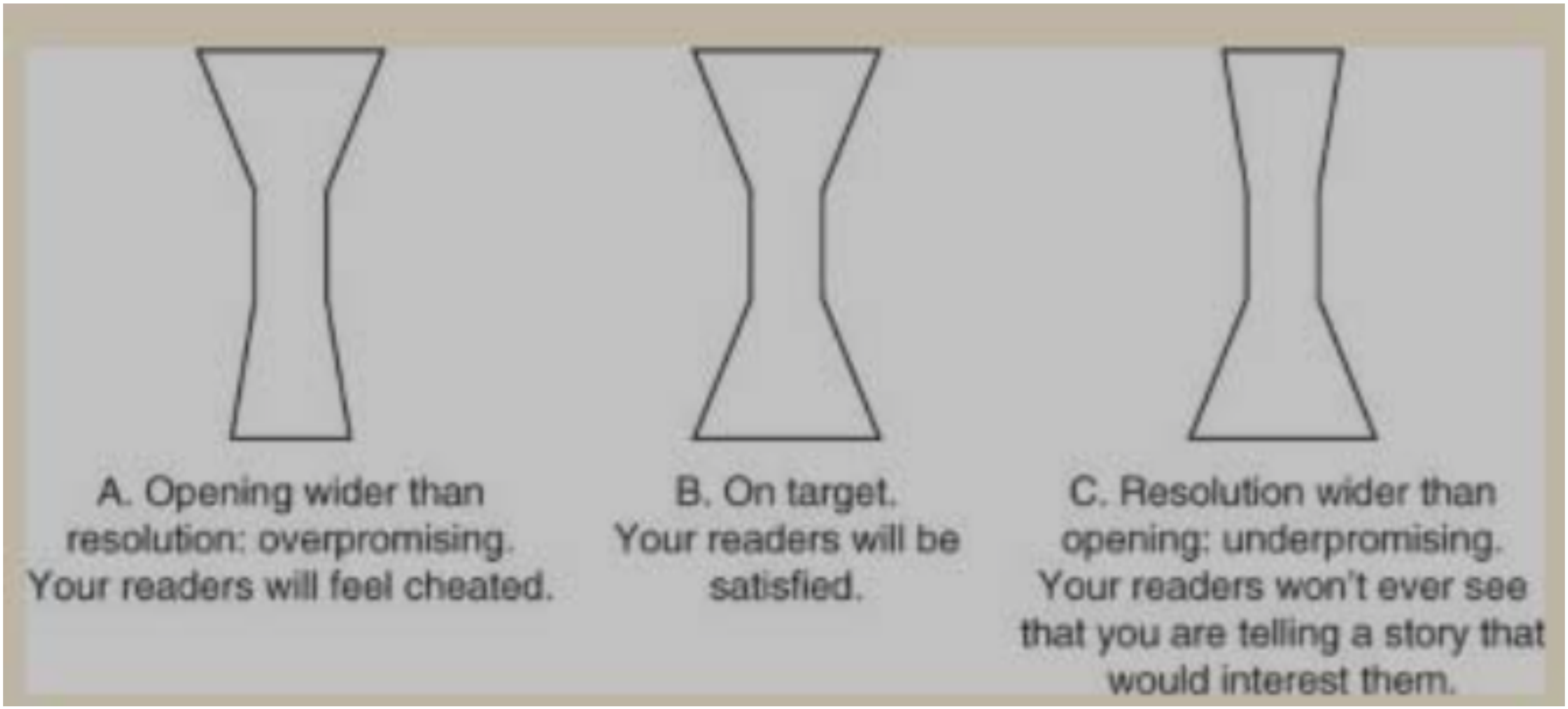
Is there even a hint of a puzzle?

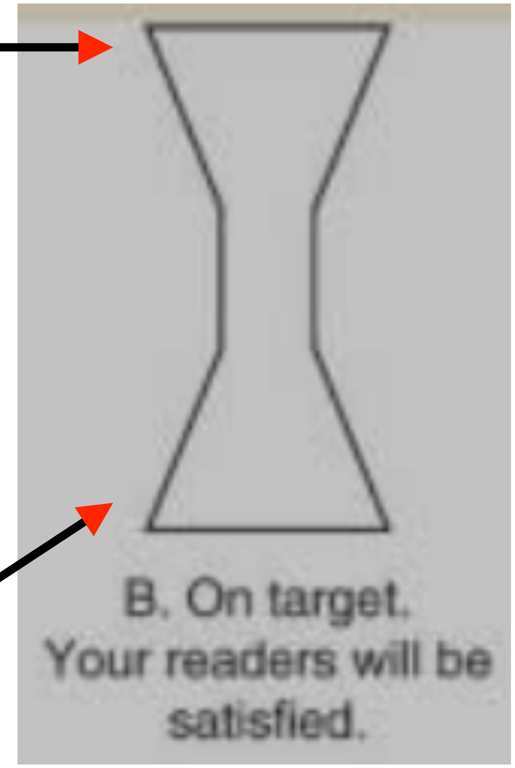
You should match the scope of the opening to the resolution



The effective opening paragraph:

1. INTRODUCTION

Once thought to be a simple evolutionary sequence, the pathways leading galaxies from the star-forming blue cloud to the quiescent red sequence have been revealed to be incredibly diverse (Barro et al. 2014; Schawinski et al. 2014). The cessation of star formation appears to happen on vastly different timescales, strongly dependent on a galaxy's growth history (Martin et al. 2007). A class of unique objects called post-starbursts galaxies (PSBs) appear to be the remnants of the most violent of such "quenching" events.



molecular gas densities. These results paint a coherent picture of systems in which star formation was, indeed, rapidly truncated, but in which the ISM was *not* completely expelled, and is instead supported against collapse by latent or continued injection of turbulent or mechanical heating. The resulting aging burst populations provide a "high-soft" radiation field which seemingly dominates the E+As' unusual ISM energetics.

Well-matched in scope, and even foreshadowed "timescales"!

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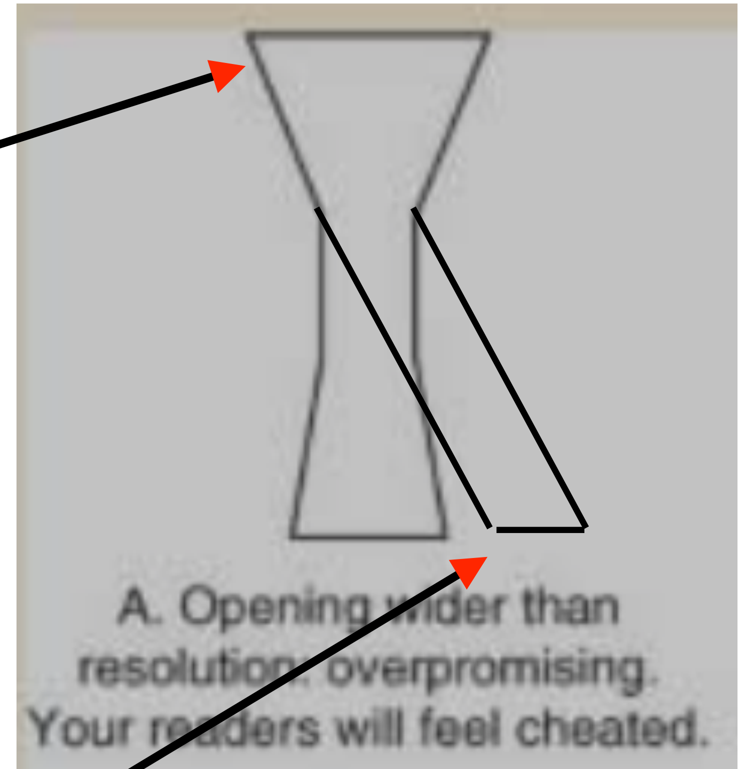

most HIX galaxies live in higher-spin haloes than most control galaxies. These results suggest that HIX galaxies are H I-rich because they can support more H I against gravitational instability due to their high specific angular momentum. The majority of the

Very different in scope, and not well-matched in topic (went somewhere quite different)

The Challenge

- Opening
- Challenge
- Action
- Resolution

You want to set up a challenge that will *engage* a variety of readers

The Challenge

Effective "challenges" highlight scientific questions/mysteries

Ineffective "challenges" focus more on writer's goals than potential reader's goals.

The Challenge

Effective "challenges" highlight scientific questions/mysteries

"Why are some galaxies able to hold so much more gas without turning it into stars?"

The Challenge

Ineffective "challenges" focus more on writer's goals than potential reader's goals.

"We wanted to characterize the gas-rich galaxies in our sample"