



Ideal writing process:

1. Plan, strategize, proximal goals
2. Time management, self-monitoring, incremental progress
3. Revise, review, revise again
4. Writing goals accomplished
5. Self-respect and accolades

Actual writing process:

1. Netflix
2. Guilt

2:13 PM - 15 Dec 2017

Hacking your writing process

Or “How to trick yourself into doing what you need to be doing.”

Aim

Frequent, steady progress
towards achievable goals.

We all have different
motivators

External? Internal?

Fear? Praise?

Reward? Punishment?

Identify yours, and make
it work for you

External? Internal?

Fear? Praise?

Reward? Punishment?

External

Involves looping another person or people into your process

External

- Accountability buddy

Peer

Can be mutual writing support

Can help keep goals realistic

Can involve tangible rewards
(night out together, etc)

External

- Mentor*
 - Can give writing input, which may speed process.
 - May not have realistic expectations of rate of writing.
 - Desire to impress can be both positive and negative.

*This is often students' unconscious default, and it's a risky one.

External

- Public
 - Announce goals
 - Announce progress towards goals
 - Blog, Facebook, Twitter, Github

External

Key is frequent, consistent accountability checks.

External

Risk is “what happens when
your situation changes?”

Will your habits survive when
your circumstances change?

Internal

Harnessing your motivation to form effective habits

“The Power of Habit”

Habits

Cue → Routine → Reward

“The Power of Habit”

Habits

Cue → Routine → Reward

- Location
- Time
- Music
- Food

Habits

Cue → Routine → Reward

- Write
- Consistent tools

Habits

Cue → Routine → Reward

*Negative
Pain avoidance*

- Freedom from worry
- Reduced stress
- Freedom from fear



Jon Winokur 
@AdviceToWriters



Following

Work finally begins when the fear of doing
nothing exceeds the fear of doing it badly.
ALAIN de BOTTON

#amwriting



Habits

Cue → Routine → Reward

*Positive
Fulfillment*

- Checking off lists
- Plotting progress
- Treat
- Activity

Habits

Cue → Routine → Reward

*Positive
Fulfillment*

Usually more
effective,
long term

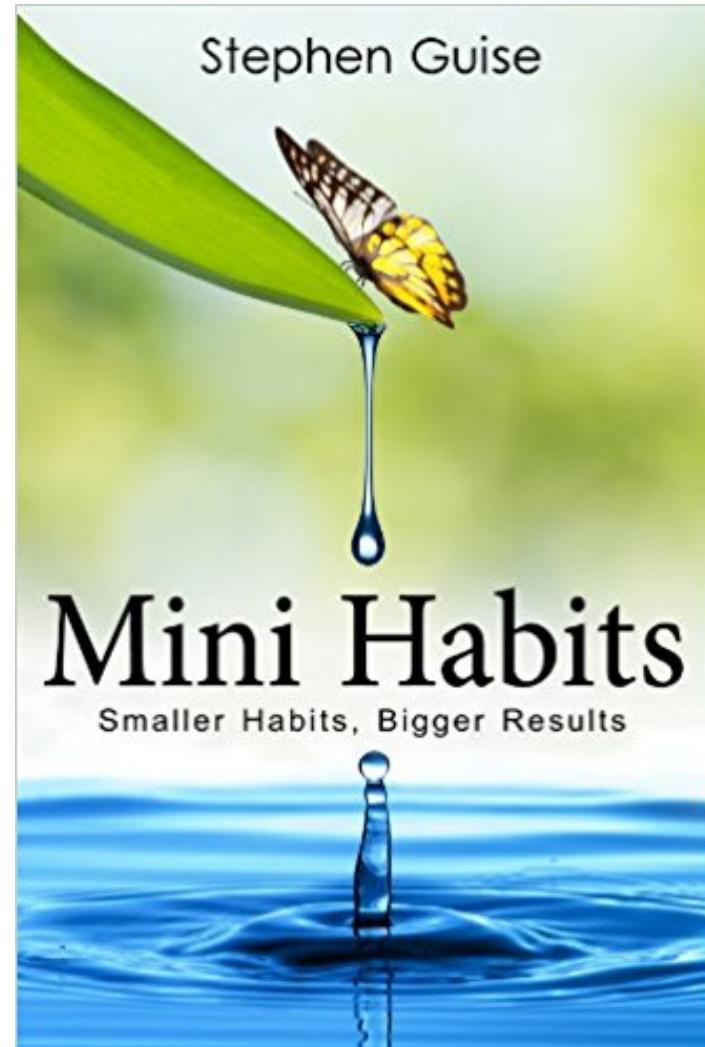
Changing Habits



Keep the cue, change the routine, improve reward*

*if needed

“Mini-Habits”



Keep your goals small
and trivial to achieve

- One push-up a day
- One sentence a day
- Read one abstract a day

Mapping your writing

i.e.,

“Outlining on steroids”

Why outline?

Outlining makes writing
more efficient.

Efficiency gains #1

- Partially answers “what do I want to say?”
- Clarifies “work still to be done”.
- Helps identify work w/ long lead time.

Efficiency gains #2

- Can get high-value input from collaborators at an early stage.
- Reveals structural problems in text early, before investing time writing.

What do I mean by “structural problems”?

Are you....

Explaining things in the wrong order?

Explaining too much at the same time?

Missing information?

Motivation unconvincing?

Line of argument confusing?

None of these are simple “language problems”

Explaining things in the wrong order?

Explaining too much at the same time?

Missing information?

Motivation unconvincing?

Line of argument confusing?

Structure can be flawed, even
when every paragraph is perfect.

You can't just tweak words and sentences to fix these.

- Explaining things in the wrong order?
- Explaining too much at the same time?
- Missing information?
- Motivation unconvincing?
- Line of argument confusing?

You have to move or cut entire *paragraphs and sections.*

An aside: Cutting entire
paragraphs and sections can hurt.

Put them in another document in
case you need to resuscitate.

Why you should pay close
attention to structural
problems:

Easy to fix early.

Harder to fix once text is
written

Issues to consider when outlining

What points do I need to
make?

Issues to consider when outlining

What information do I
need to provide to make
those points?

Issues to consider when outlining

What ancillary information
do I need to include for
completeness/reproducibility?

Issues to consider when outlining

What order provides the
most natural transitions
between topics?

Issues to consider when outlining

**What order will help the
reader understand my
procedure/results?**

Ordering your outline

Follow similar rules as
ordering sentences within a
paragraph.

Ordering your outline

- Simple to complex
- General to specific
- Familiar to unfamiliar
- First to last
- Certain to speculative
- Obvious to subtle
- Straightforward to profound

You can't *always* do this...

- Simple to complex
- General to specific
- Familiar to unfamiliar
- First to last
- Certain to speculative
- Obvious to subtle
- Straightforward to profound

That's fine, if you signal to the reader
when you're taking a detour.

Ways to signal a detour

- “Before we X, we must first Y...” And later, “With Y in hand, we can now return to X...”
- “We color code the points according to X (calculated in Section Y below)...”
- New sub-section heading.

Why is choosing presentation order so difficult?

Many things in science are inter-related.

Yet somehow, you have to pick a presentation order

Some strategies for presenting fundamentally complex ideas

Tips for complex topics

Remember that you can take your time to walk the reader through.

Think about how you'd explain it to a class

Tips for complex topics

You don't need to say
everything about a topic the
first time it's mentioned.

*You can introduce a topic, but build in nuance
gradually, or much later in the paper.*

Tips for complex topics

If you want to stick something in “because the reader needs to know”, maybe that fact gets its own paragraph or subsection.

Tips for complex topics

If you want to stick something in “because the reader needs to know”, maybe that fact gets its own paragraph or subsection.

But, that fact’s paragraph may land someplace very different in the paper, where it’s needed for interpretation.

Tips for complex topics

When ideas are interrelated,
you should consciously pick
apart the tangled threads,
introduce each in turn, and then
tie them back in a knot.

Tips for complex topics

Example: Presenting straightforward data before discussing interdependencies

- Discuss plots with mass dependence
- Discuss plots with metallicity dependence
- Discuss plots with SFR dependence
- Discussion of plots about how mass, metallicity, & SFR are connected

Strategies for developing your outline

“Word Stack”

Make a list of *absolutely everything* you need to mention in a section.

“Word Stack”

Do not order your list or
prioritize!

Just get it all down so you
remember to find a place for
everything.

The word stack becomes:

A starting point for organizing
your outline

and

A reference to make sure your
outline is complete

Revising your outline

Very similar to revising
presentations

Revising an outline/ presentation

- “Oh wait, I need to explain this first”
- “This part is too long”
- “I need to spend more time discussing this plot”
- “I need to add some background info”

Other points about outlining

It is ok to talk about something more than once, especially in a long paper.

Subsequent times normally have more detail & nuance.

How to talk about something more than once

1. Match level of detail to what context requires.

2. Only give detailed view once.
All other mentions are “framing” or “reminders”

Example where result depends on application of new method

- Intro: Gives *high-level, general principles*.
- Methods: Gives *technical details*
- Discussion/Analysis: Gives *reminder suitable for someone who skipped ahead from the abstract*

Other points about outlining

An outline is not a contract

You *will* have scientific and textual insights that require revisions.

Other points about outlining

The closer you get to “topic sentence” level, the more useful your outline will be

Definitely helps efficiency....

Tools for outlining

How do I map out the
structure of my paper or
proposal?

Tools for outlining

Ye olde ascii file

Tools for outlining

A LaTeX file of the paper,
w/ section headings,
bulleted lists, & figure
captions

Tools for outlining

Powerpoint/Keynote

Good for people who are more
confident about teaching &
presenting than writing

Tools for outlining

Index Cards

One idea per card.
Also useful if you find you have
to restructure a paper.

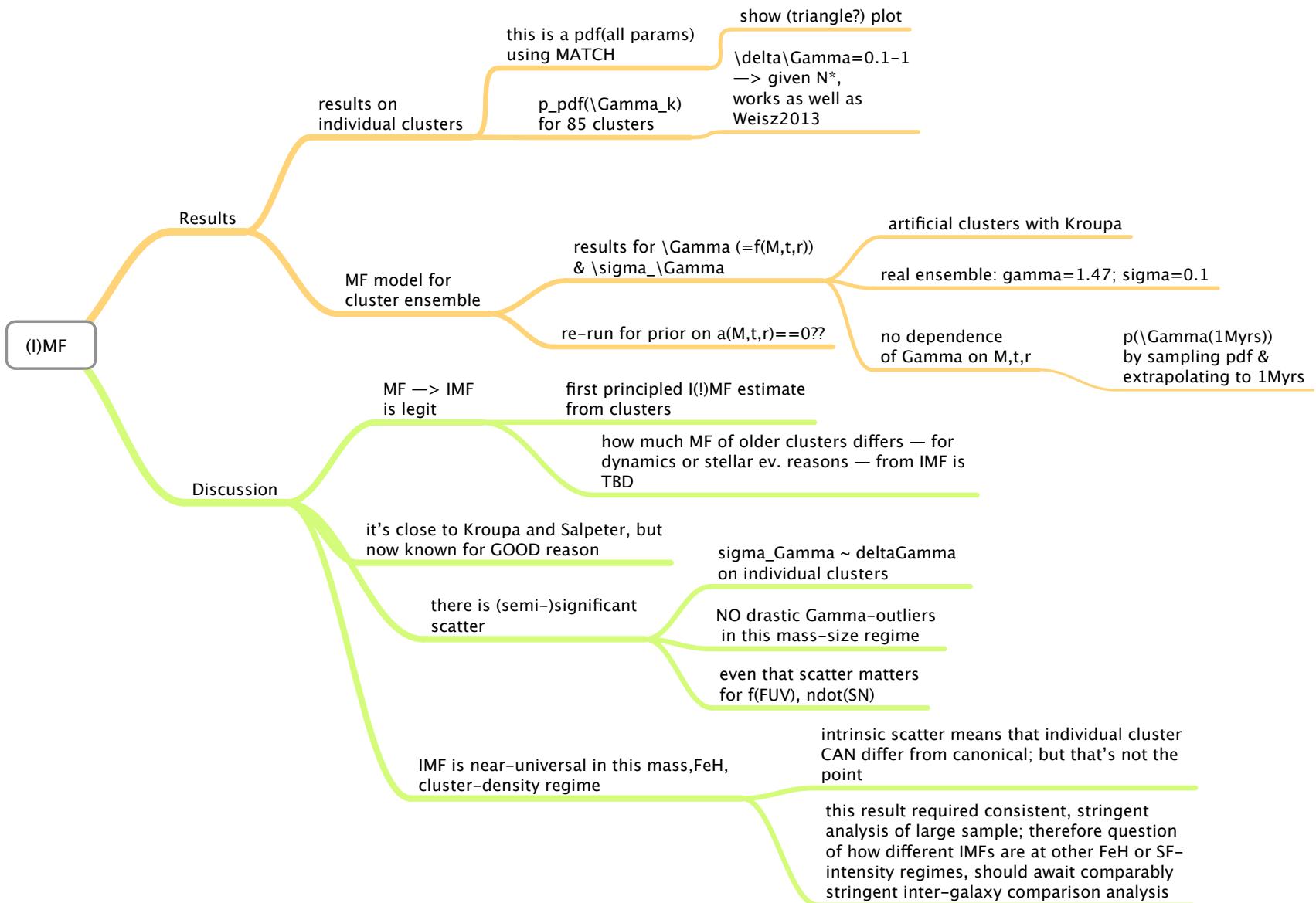
Outline for “Immortal Life of Henrietta Lacks”



<http://niemanstoryboard.org/stories/rebecca-skloot-immortal-life-of-henrietta-lacks-interview-narrative/>

Tools for outlining

“Mind mapping”



<http://mindnode.com>

Has free trial. Paid version lets you drag & drop nodes.

<http://www.xmind.net> is another free Mind Mapping tool.

Word Stack + Outlining Exercise

“How to survive and thrive
during your first year of
graduate school”

Results of previous exercise

Wordstack:

Mental/Emotional

Have a work life balance
Meditate on your values
Don't work on weekends
Therapy is awesome
build routines for self-care
Find the most relaxing place that you love and treasure it
Find your community

How to succeed on the scholastic/research side

Find the sweet spot between excellence and perfection
Find a system for organizing journal articles
Talk to other older students about norms in department
Take charge of your advising relationship
You'll feel like you're failing but you're not

Organizational

Pay attention to budgeting finances
build routines for self-care
Have a calendar
Have a to-do list

Results of previous exercise

(From previous year, showing there are multiple good approaches one could take!)

Wordstack:

- learn github
- get enough sleep
- managing expectations
- cookbooks rock
- get a calendar
- learn to set reasonable goals
- talk to other grad students
- prioritize goals
- have something other than grad school to destress
- take stock of progress
- get a plant and nurture the crap out of it
- be ok if plants die. it's the cycle of life
- go outside sometime
- take a coding bootcamp
- do your work with classmates
- develop healthy relationships with stimulants and downers
- don't answer emails at night
- don't send emails at night

Maybe within subsections, repeat structure of "do's" and "don'ts"

What is grad school

- Classes
- Certification exams
- Research
- Personal experiences
- Challenges with the above

Work Habits

- Classwork
- Research
- Skill sets
 - Internal
 - External?

Personal Habits

- Short term (weekly daily)
- Long term (overall)

Disentangling a paragraph example

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....”

Maybe that transition is a little abrupt.

“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.

Given this complex history, the final 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....”