

Publication & Reporting

*From Avoidance to
Transparency & Mental Health
Considerations in Research*

GCC Rigor & Reproducibility
Workshop

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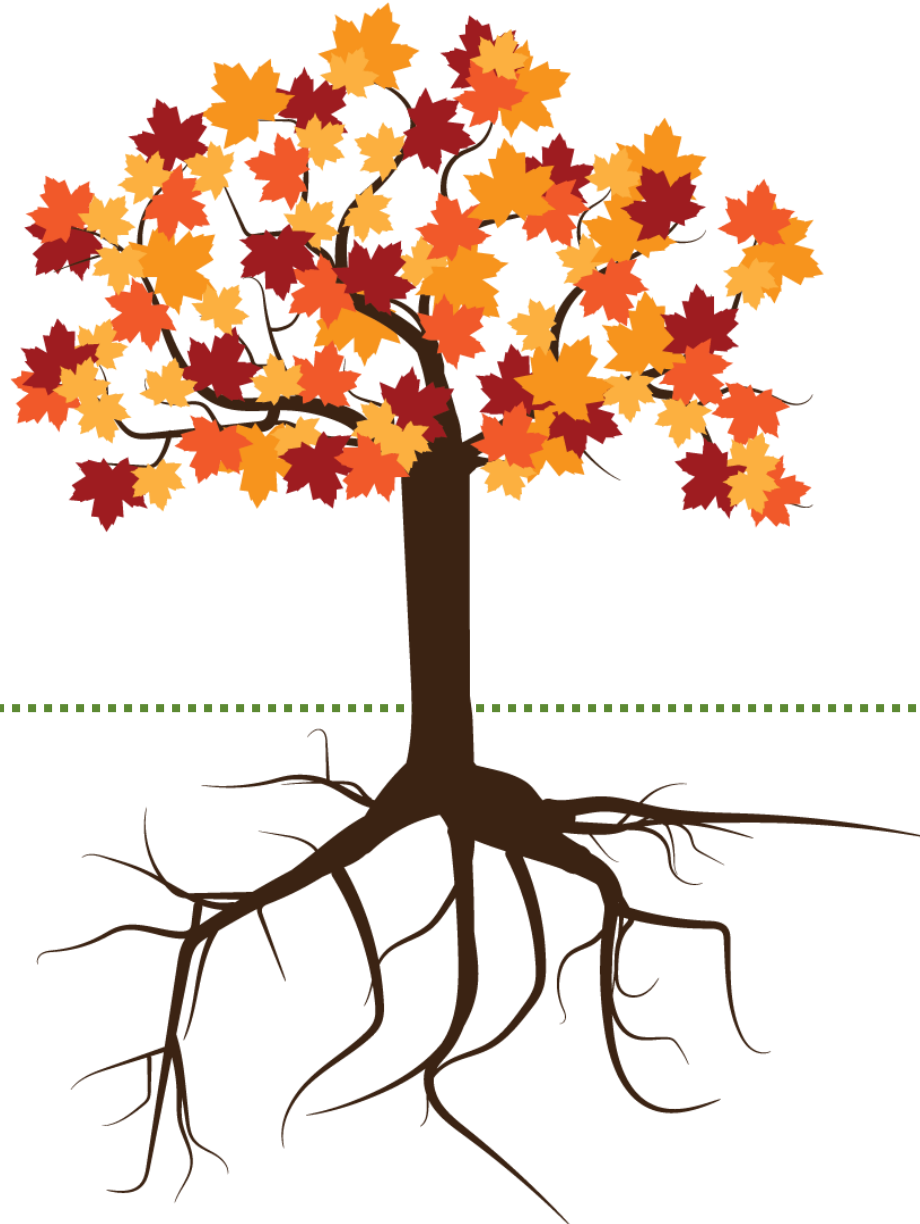
Why do we loathe Publication & Reporting?

*Think about examples in which you personally
have exhibited avoidance behaviors (e.g.,
procrastination) with respect to publication
&/or reporting in any of your current or past
research projects.*



The landscape: The Research Process

What's visible



The landscape: The Research Process

Self-initiating

Procrastinating

Flexible/Adaptable

Rigid/Fixed

Focused

Off-topic/rabbit holes

Organized

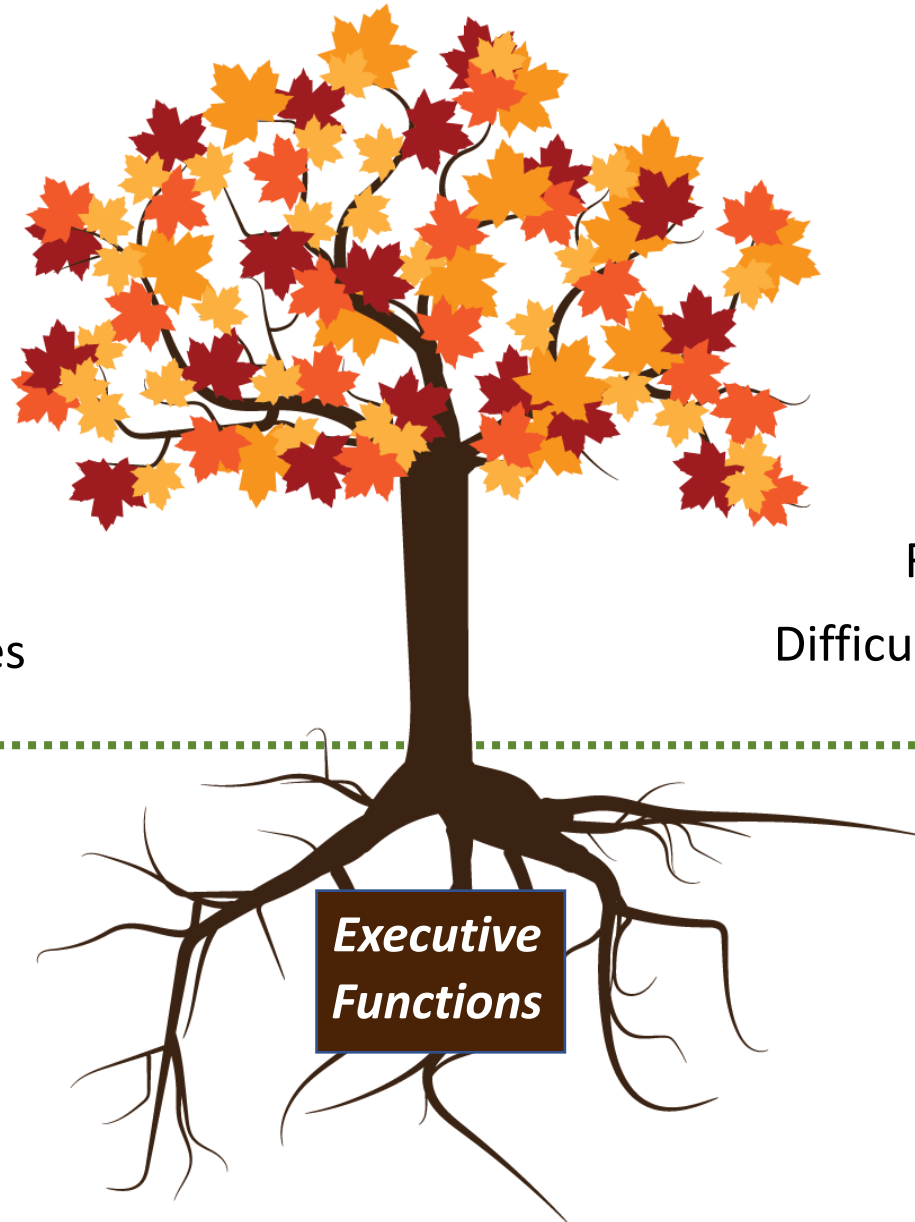
Disorganized

Unimaginative

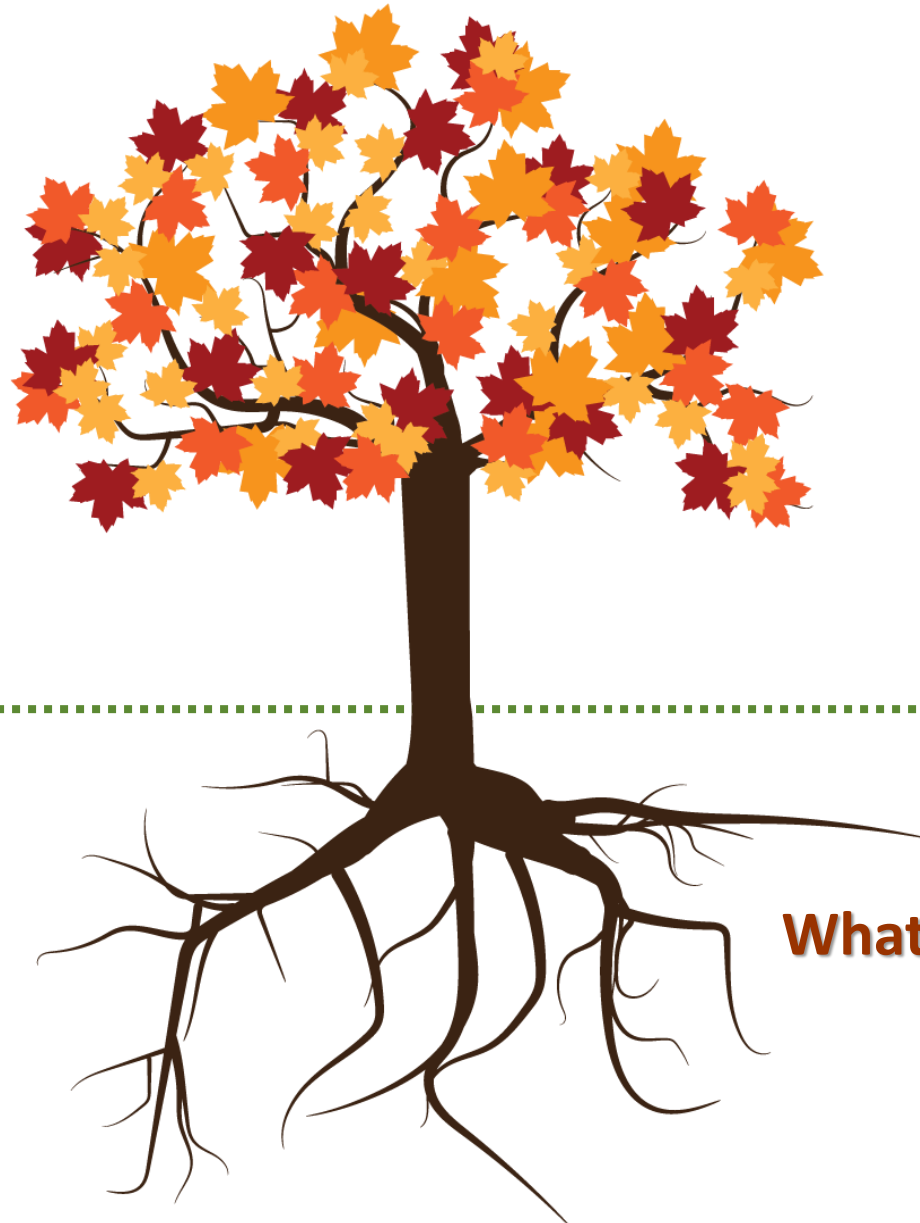
Creative

Follows guidance

Difficulty with feedback



The landscape: The Research Process



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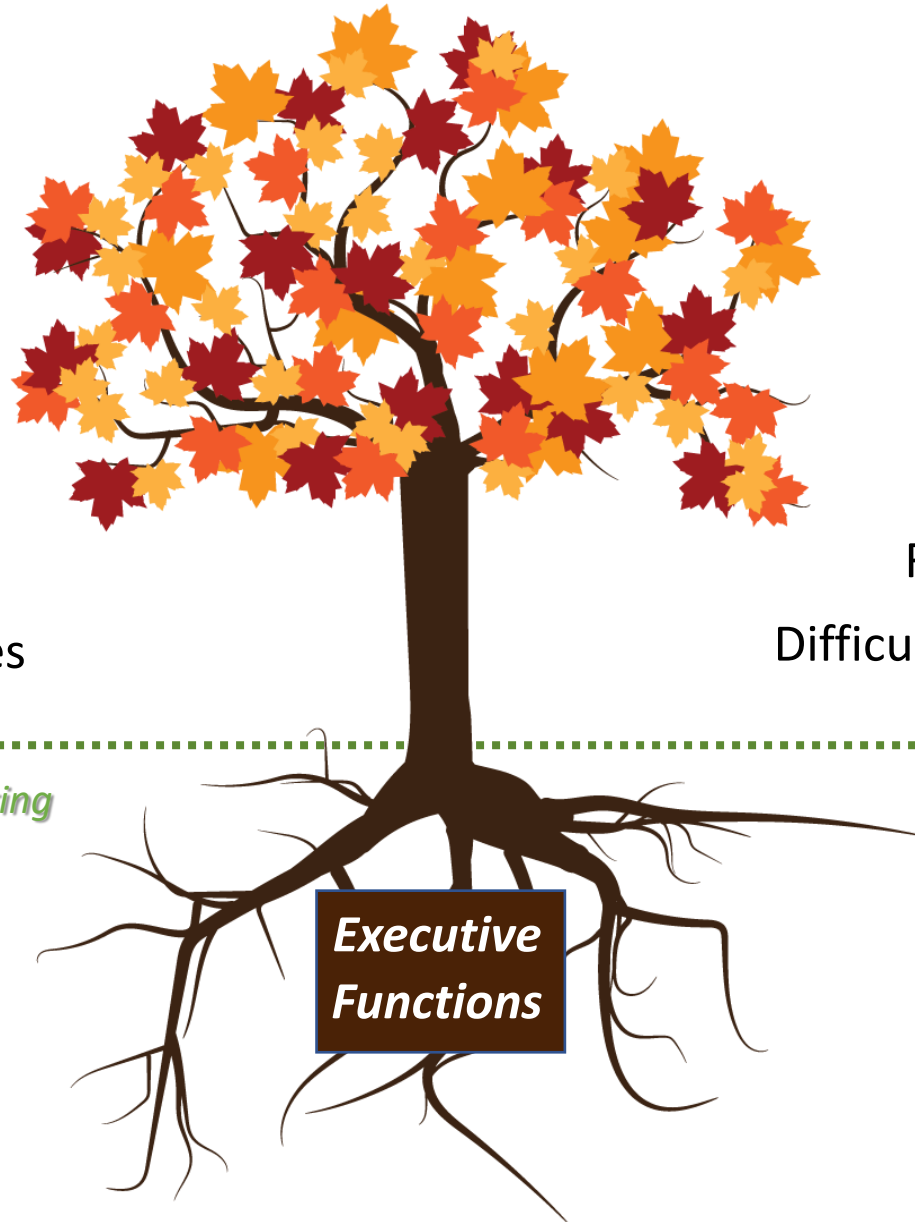
Cognitive Flexibility/Shifting

Initiation

Working memory

Self-monitoring

Inhibition



Organized

Disorganized

Unimaginative

Creative

Follows guidance

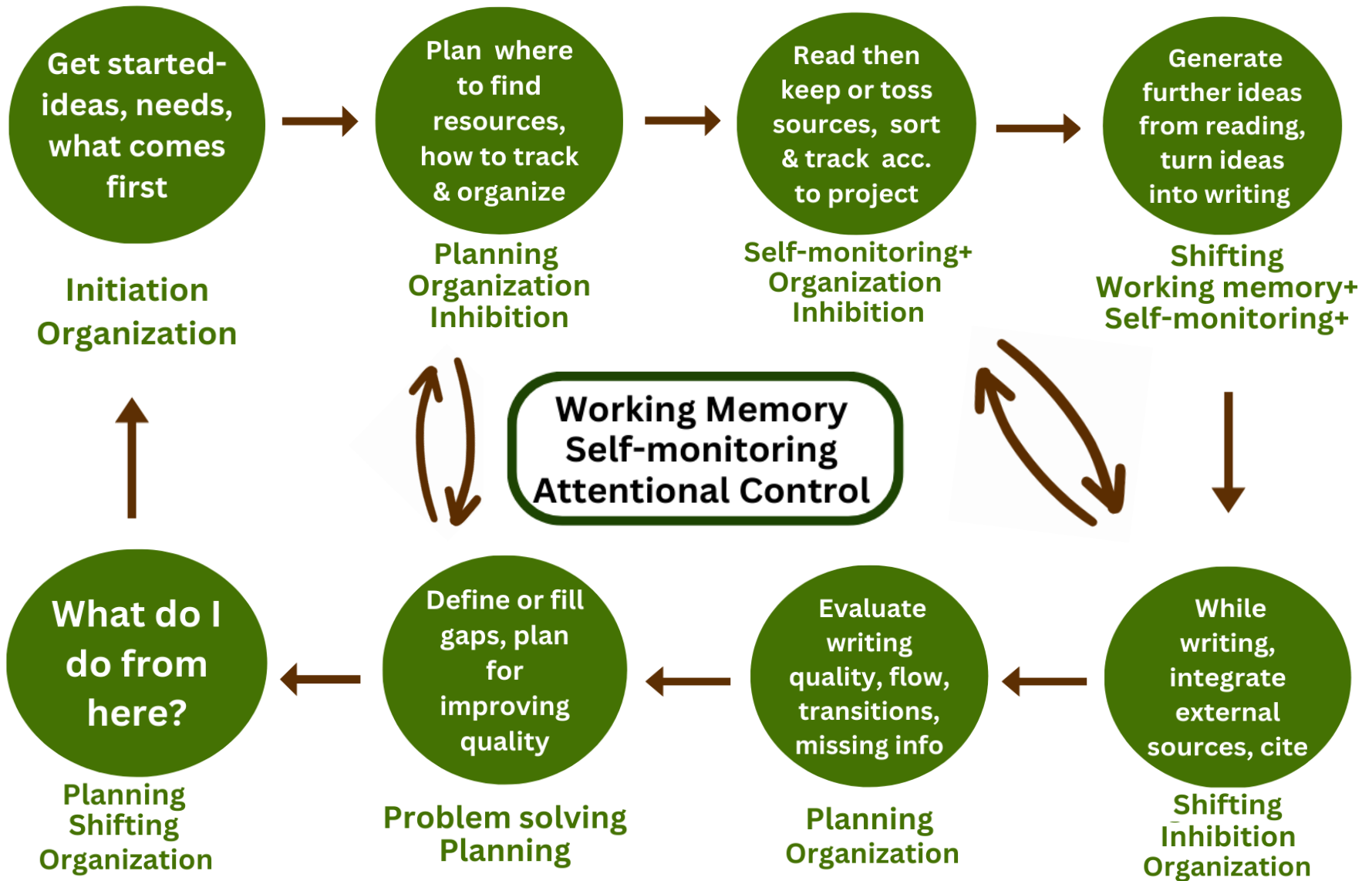
Difficulty with feedback

Organization

Planning

Attentional Control

Problem Solving



Inhibition / Inhibitory Control

What is it?

- Stopping an action or behavior (before starting, or discontinuing)
- Difficulty in determining and ignoring irrelevant info

What does it look like:

- Research off-topic &/or off-task
- Research tasks behind schedule
- Scientific communication quality suffers

Initiation

What is it?

- Getting started on a task
- Increased focus necessary to increase momentum on a task

What does it look like:

- Research tasks behind schedule
- Visible lack of productivity
- Little to show / putting it off tasks / no timetable for progress
- Doing other productive but off-task things instead
- Easily distracted

Organization

What is it?

- Sorting and ordering tasks, things, people, or time
- Either lack of or exhibiting a dysfunctional excess of organization

What does it look like:

- Difficulty locating resources/files
- Mixing up tasks, steps, citations, etc.
- Difficulty estimating time needed for life and work tasks
 - *Chronic lateness / inability to meet deadlines*
- Unable to articulate the plan or where they are in a project

Attentional Control (Focus)

What is it?

- Having to initiate a task/topic & then maintain attention
- Working memory underpins this component of EF, so anyone at any time can be affected
 - *Distractors include: environmental, biological, social, emotional stimuli*

What does it look like:

- After starting, getting lost in the middle
- Getting pulled into related but irrelevant topics or tasks
- Likely to self-identify as not being able to focus

Problem Solving

What is it?

- Addressing an issue in completing the task/goal
 - *Factors:*
 - *Urgent vs non-urgent*
 - *Internal (i.e. focus) vs external (i.e. few sources)*
- Cognitive flexibility opens up creativity for PS & organization enables PS

What does it look like:

- Getting stuck often, may have difficulty determining options
- May rush and choose less-effective solutions
 - *Unaware or hesitant of solutions*

What Impacts Executive Function?

All of the EF components on the previous slides can be directly & negatively impacted by:

- **Mental health**
 - **Most common: Anxiety & Depression**
 - Other diagnoses: Burnout, TBI, ADHD, Autism, Dyslexia
- **High stress &/or chronic stress**
- **Poor sleep**

(Balogh & Czobor, 2016; Borella, et al., 2010; Fabio & Capri, 2017; Held, et al., 2020; Matsuura, et al., 2014; Slife & Weaver, 1992; Smith, et al., 2015; Torenvliet, et. al, 2022)

What is Avoidance - Motivated Behavior?

Our behavior when we distract ourselves from doing a task that is associated with an unpleasant emotion, typically fear

(Approach – Avoidance)

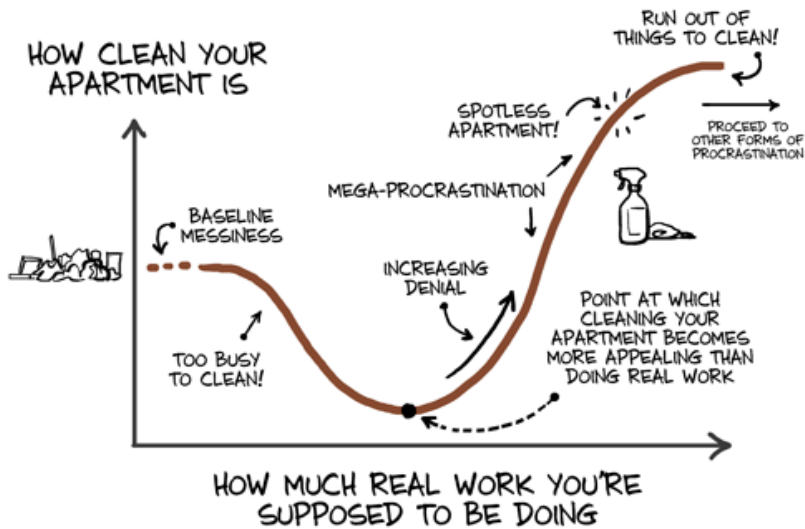
3 main types of behaviors:

- **Complete Avoidance**
 - *No showing at a presentation, Failure to submit documents, Quit a responsibility*
- **Escape**
 - *Leaving early from a commitment, Ending a talk abruptly, Hiding in one's office*
- **Partial Avoidance**
 - *Daydreaming, Avoiding eye contact*
- **Worry, Anxiety, Panic**
- **These behaviors do not reduce anxiety, rather they can fuel it or cause difficult situations to “snowball”.**

What is Avoidance - Motivated Coping?

We do something else instead to bring momentary relief

#1 way....Procrastination



WWW.PHDCOMICS.COM

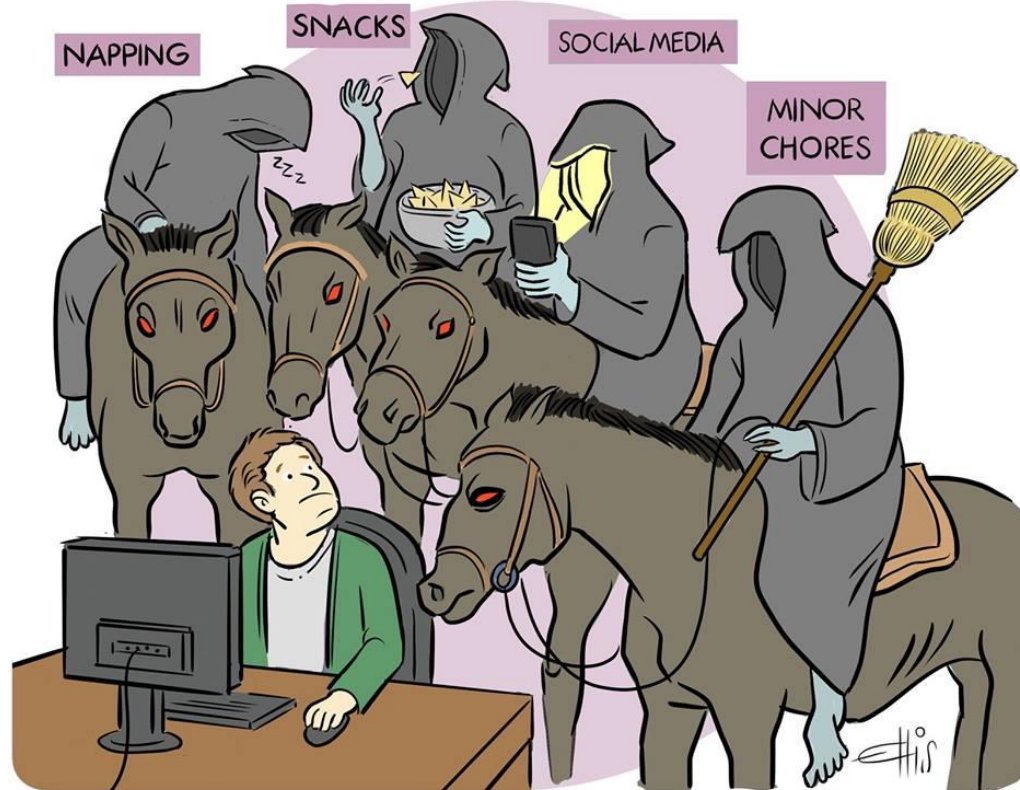
JORGE CHAM © 2013

- A FIELD GUIDE TO - PROCRASTINATORS

| | | |
|---|---|--|
| <p>Before I can start, I need to do some laundry. There I have to sort my sock drawer, organize my music collection, and clean up my desk so I have room to work!</p> | <p>Omg. Omg. Omg. Omg. Omg. Ommgggg!!!! I'M DOOOOOOMED!!!!</p> | <p>I SHALL MAKE... A LIST!!!</p> |
| <p>The Cleaner</p> | <p>The Panicker</p> | <p>The List Maker</p> |
| | <p>Well, I need to work on the thing that is due tomorrow, but I just got the greatest idea for this other thing that is due next month! I'll work on that first!</p> | <p>Mr. Productive Here is a picture of me not doing work! Hehehehe!</p> |
| <p>The Napper</p> | <p>The Sidetracker</p> | <p>The Social Sharer</p> |
| <p>LOL. This video of a cat swimming in a kiddie pool of spaghetti is such a crucial part of my research.</p> | <p>Just need a little snack...</p> | <p>Hold on! I'll get to work after I take care of some things in my town. I just need to finish arranging some furniture, catch a bug, pull the weeds, and water my flowers!</p> |
| <p>The Internet Researcher</p> | <p>The Snacker</p> | <p>The Gamer</p> |
| <p>Right after this episode...</p> | <p>Ok, team! Let's split the work in half. One of you take one half, and the other take the other half!</p> | <p>Well, I was going to start 30 minutes ago but now it's getting a little late... so I'll just have to start on it tomorrow!</p> |
| <p>The Watcher</p> | <p>The Delegator</p> | <p>The Perpetuator</p> |

Modern Procrastination...

THE FOUR HORSEMEN OF PROCRASTINATION



What is Avoidance - Motivated Coping?

Doing something else instead to bring momentary relief

Data Fabrication

- Data were never collected. Data is then “made up”.

Data Falsification

- Data illegitimately altered

<https://ori.hhs.gov/>

<https://blog.frontiersin.org/2021/07/09/research-integrity-a-closer-look-at-gel-and-western-blot-image-cropping/>



Why exhibit avoidance behaviors in P&R?

FEAR

- Fear of Failure

Pressure

- Pressure to have high impact publication(s)
- Lab/Peer Pressure
- Visa/Employment Pressure

Should I publish negative results or does this ruin my career in science?

smartsiencecareer.com



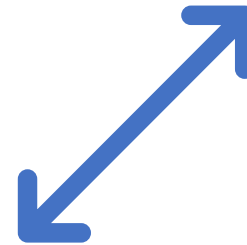
Why exhibit avoidance behaviors in P&R?



Difficulty with Time Management

Administration & writing can take a significant amount of time away from productivity

P&R deadlines can create time conflicts with other commitments (family, teaching, service, travel, ...)



“Lack of Progress”

Often, we feel like we have not been productive enough... which can be paralyzing

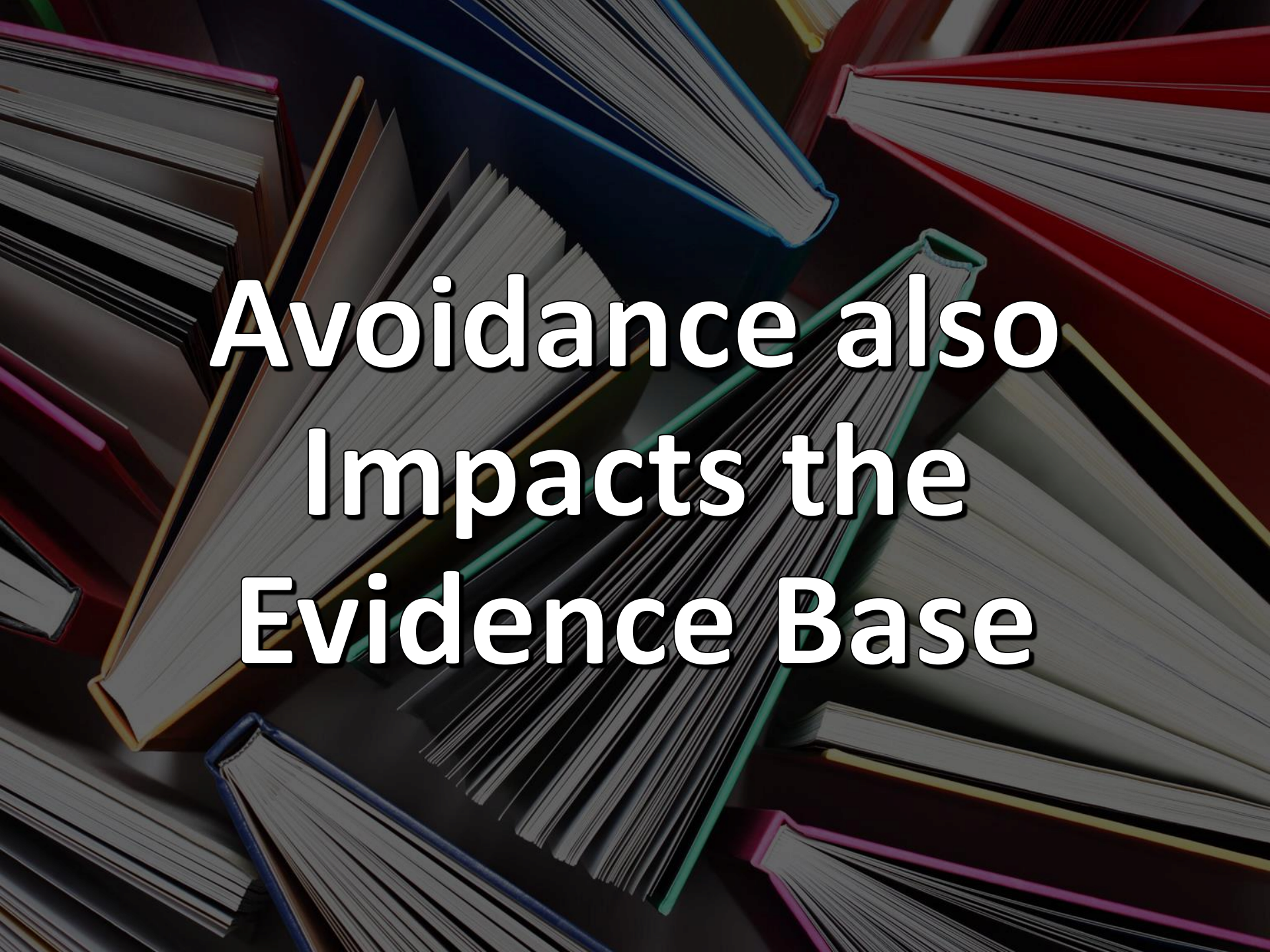
Difficulty in acquiring needed info (e.g., ambiguous documentation)

Progress can feel like a moving target

Avoidance Impacts our Professional Lives

- Missed Deadlines
- Delayed Publications
- Late Reports to Regulatory & Funding Entities
- May Impact Promotion & Tenure, Career Advancement





**Avoidance also
Impacts the
Evidence Base**

Publication & Products of Research

Most commonly sought products of research

- Peer-review publications in top-tier journals
 - *May require open access agreements for data produced (federal mandates)*
- Conference papers / podium presentations
- Abstracts / conference posters
- Technology Development &/or Techniques
- Inventions: Patents, patent applications (NPA, PPA), licensing agreements

Publication & Products of Research

Who does the work?

- PI / Co-Is are typically senior authors
- Post-docs, Research Assistants
- Graduate Students, possibly Undergrad students
- Lab Techs



Typically, these are team efforts which the PI supervises

- PI can ideally spend time to other projects and commitments
- Majority of work likely done by junior scientists / trainees***
- *Avoidance behaviors exist @ all levels of science*

Research Reporting Types

Common types of reporting in research

- Department/Center/University Annual Reports
- IRB / Human Subjects Protection
- IACUC / Animal Research Oversight
- Federal Regulatory Bodies (eg. FDA)
- **Funding / Grants**
 - Federal (NIH, NSF, etc)
 - State (CPRIT)
 - Local (Dunn Foundation)
 - Private Foundations (AHA, ADA, etc)



Research Performance Progress Reports (RPPRs)

Federally mandated format required by NIH

- Similar formats & information required by other funding bodies
- Typically done on an annual basis

Only the PI or a noted delegate can initiate


- This can require a major time & resource commitment by the PI
- Majority of work likely done by PI
 - *May have to formally submit the document to the funding body & institution*

Does your institution have administrative resources to help you with this?

- Ask your administrative staff about this!!!

RPPR Required Components

- **Accomplishments**
- **Publication & Products**
- **Patient &/or Animal Recruitment & Safety Reports**
- **Collaborative Efforts**
 - **Multi-site projects**
- **Impact (NSF)**
- **Project Changes, Challenges, & Problems**
 - **Modifications to Protocols**
- **Financial Reports & Budget Changes**
 - **Rationale for alterations**

The background features a stack of books at the bottom, with an open book on top. The entire scene is overlaid with a semi-transparent dark layer. Scattered across this layer are various white mathematical symbols and icons, including plus signs, question marks, the Greek letter sigma, the letter X, the letter Y, and the number 0. The main title is centered in a large, bold, yellow font.

What about reporting standards for manuscripts?

Are there core reporting standards for manuscripts?

What about grant applications?

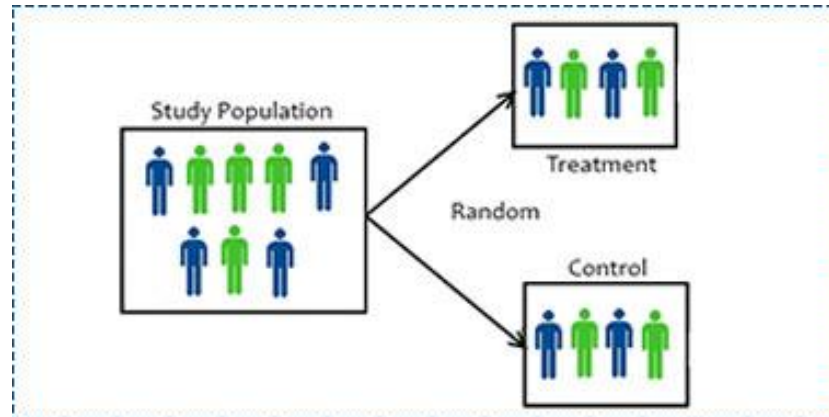
Core Reporting Standards

1. Randomization

- Animals &/or human subjects should be assigned randomly to the various experimental groups, and the method of randomization reported.

2. Blinding (single, double, etc.)

- Allocation concealment
- Blinded conduct of the experiment
- Blinded assessment of outcome



Core Reporting Standards

3. Sample Size & Estimation

| | Measure | units | Control | Patient | α | Power | n / group |
|--------------|--------------------------------------|-------------------|------------------------------------|-------------------------------------|-------------|------------|-----------|
| <i>Aim 1</i> | CV Score ¹² | -- | 0.10 \pm 0.09 | 0.21 \pm 0.09 | 0.05 | 80% | 14 |
| | DFA Score ¹⁹ | -- | 0.89 \pm 0.04 | 0.96 \pm 0.04 | 0.05 | 80% | 7 |
| | Response Time ¹² | ms | 926.8 \pm 63.7 | 1021 \pm 72.9 | 0.05 | 80% | 10 |
| | Accuracy ¹² | % | 78.1 \pm 14.6 | 60.3 \pm 10.4 | 0.05 | 80% | 10 |
| <i>Aim 2</i> | Age at Diagnosis¹⁶ | years | 51.32 \pm 6.02 | 43.45 \pm 10.82 | 0.05 | 80% | 21 |
| <i>Aim 3</i> | BMI ¹⁶ | kg/m ² | 26.52 \pm 6.79 | 33.78 \pm 5.58 | 0.05 | 80% | 13 |
| | Cholesterol ¹⁵ | mg/dL | 58.76 \pm 14.25 | 35.83 \pm 11.16 | 0.05 | 80% | 17 |

4. Data Handling

- Outliers
- Endpoints (primary, secondary)
- Missing data
- Replicates

Hurdles to P&R?

Project Changes, Challenges, & Problems

- Difficulties in starting &/or running a project
 - *Instrumentation, Participants, Lab Staff, Time, Funding, ...*
 - *Lack of progress due to such difficulties*

Difficulty organizing required information by stated deadlines

- Time conflicts, communication challenges, ...

Little to no institutional support

- Some PIs need to fill out the report and submit it in its entirety
- A lot of time can be devoted to understanding what info is required, especially without administrative support



If P&R is so tough, why bother?

Negative Consequences

- Withdrawal of funding
- Inability to support current & future projects
- Inability to achieve promotion, tenure, career advancement, ...

Lack of P&R means that biases can be introduced into the evidence base

Reporting Bias

- Selective revealing (or suppression) of information/outcome of a study
- “Spinning” of unexpected or undesirable results

Citation & Location Biases

Time Lag Bias

Language Bias

Funding Bias

- Tendency of a scientific study to support the interests of the study's financial sponsor
- Predetermined conclusions may bias researchers into an expectation bias / outcome reporting bias

Strategies in Addressing Bias in P&R



**Don't withhold
critical information**



**Discuss authorship
& team
expectations early
on in the process**



Be organized



**Set realistic goals
for yourself and
your team**

May need to reprioritize



COMMUNICATE: If you are a team leader/PI and you detect stress in one of your team members, it is generally better to check in with that team member than try to wait it out.

Strategies in Addressing Bias in P&R (Considering Federal Mandates)

Use ALCOA Principles for Managing Data Quality

- Attributable
- Legible
- Contemporaneous
- Original
- Accurate

Maintain Data Integrity

- Complete
- Consistent
- Enduring
- Readily Available

Strategies in Addressing Bias in P&R

Have

... a clear achievable goal for yourself and your team

Reflect

... on the strengths & weaknesses of you and your team

Know

... your resources

Be Clear

... on your deadlines & the roles of each team member working towards

Familiarize

... yourself with expectations of editors, review boards, funders, & your institution

Which root is your issue?

As a group, reflect on which of the following executive functions contribute to your struggles with publication and reporting? What strategies can you develop to overcome these struggles?

