

# Publication & Reporting

*From Avoidance to  
Transparency in Research*

GCC Rigor & Reproducibility  
Workshop

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**S.L. Gorniak, Ph.D., F.A.H.A.**  
**University of Houston**



# 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

Self-initiating

Procrastinating

Flexible/Adaptable

Rigid/Fixed

Focused

Off-topic/rabbit holes

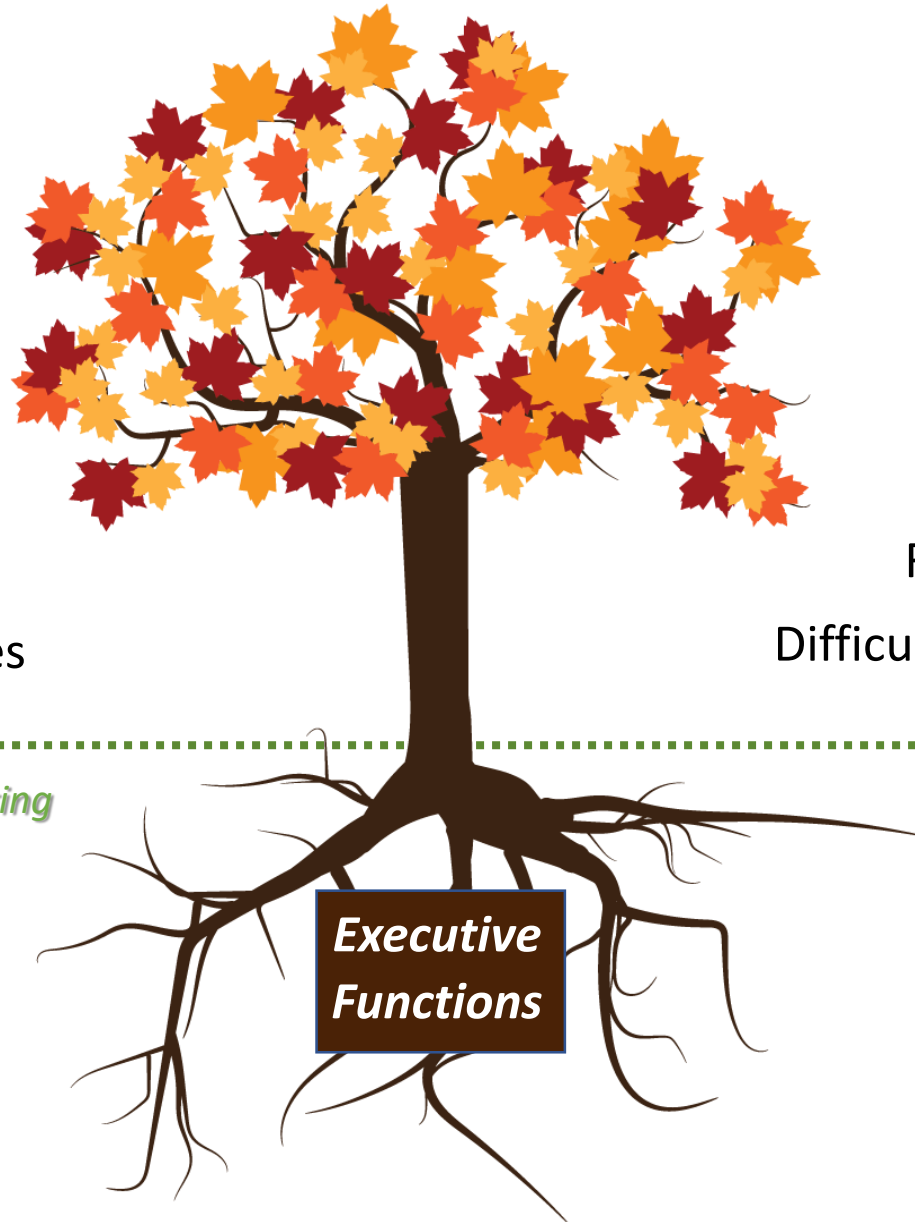
*Cognitive Flexibility/Shifting*

*Initiation*

*Working memory*

*Self-monitoring*

*Inhibition*



Organized

Disorganized

Unimaginative

Creative

Follows guidance

Difficulty with feedback

*Organization*

*Planning*

*Attentional Control*

*Problem Solving*

# 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)***

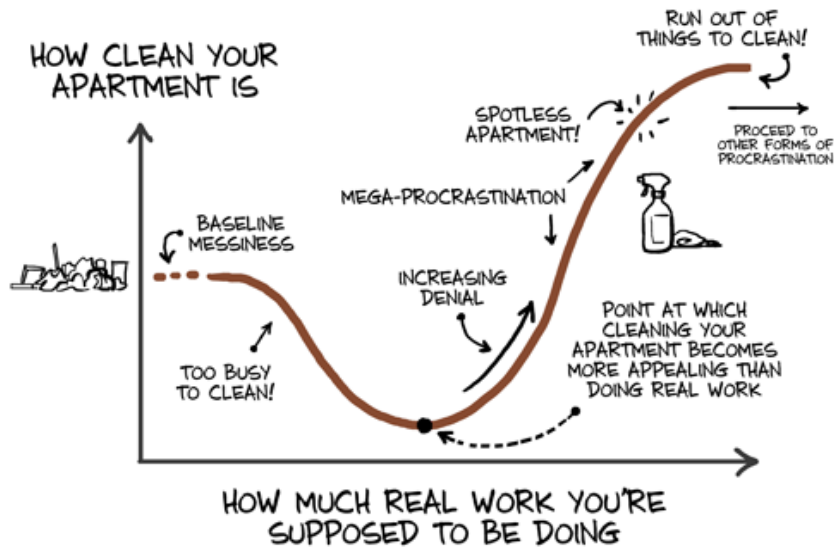
## ***3 main types of behaviors:***

- ***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

## - A FIELD GUIDE TO - PROCRASTINATORS



The Cleaner



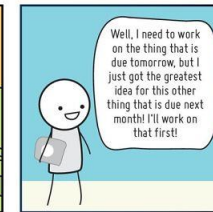
The Panicker



The List Maker



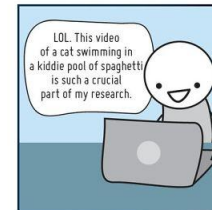
The Napper



The Sidetracker



The Social Sharer



The Internet Researcher



The Snacker



The Gamer



The Watcher

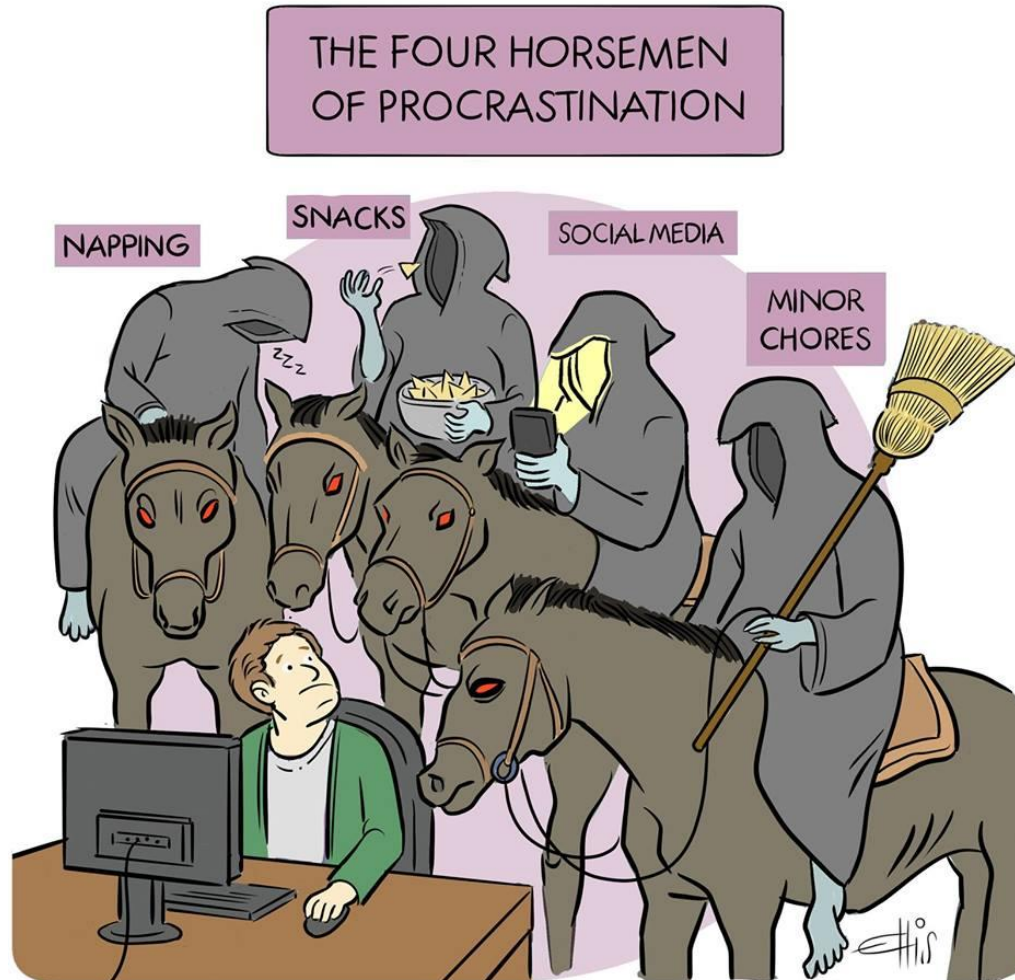


The Delegator



The Perpetuator

# Modern 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



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

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smartsciencecareer.com





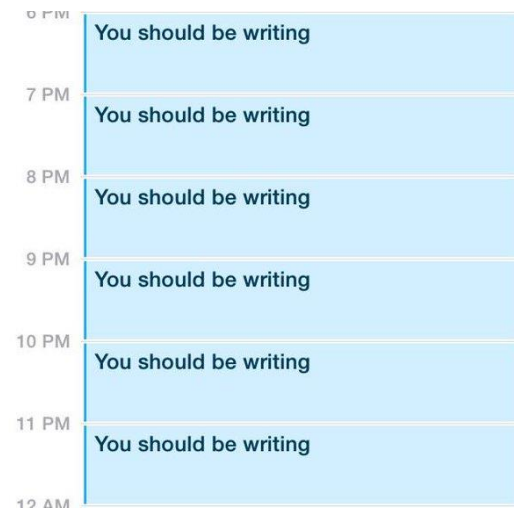
# Why exhibit avoidance behaviors in P&R?

## 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

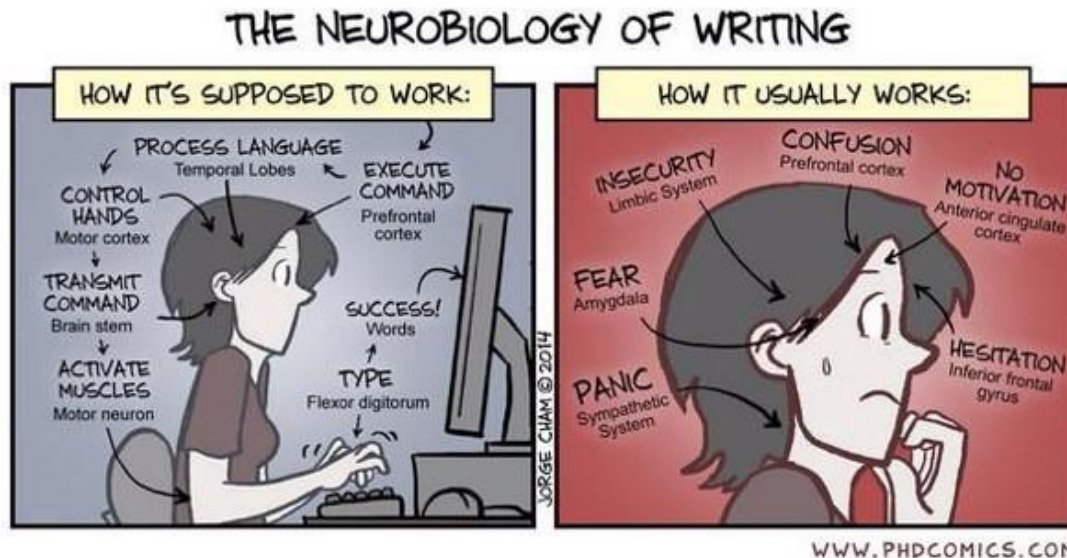


# Avoidance Impacts P&R

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

“Procrastination makes  
easy things hard and  
hard things harder.”

— Mason Cooley



# 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
- Conference papers / podium presentations
- Abstracts / conference posters
- Technology Development &/or Techniques
- Inventions: Patents, patent applications (NPA, PPA), licensing agreements
- “Other”
  - **Databases**, physical collections, A/V products, software, instrumentation, interventions, educational aids

# 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

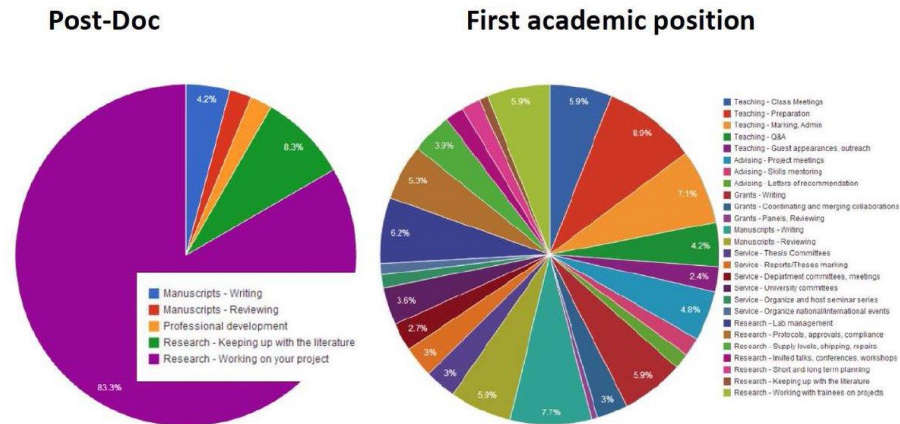
- PI can ideally spend time to other projects and commitments
- Majority of work likely done by junior scientists / trainees\*\*\*
- *Avoidance behaviors exist @ all levels of science*

# Research Reporting

## 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)

### Post-Doc vs. Assistant Prof.



# 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

- What were the major goals and objectives of the project?
- What was accomplished under these goals?
- What opportunities for training and professional development did the project provide?
- How were the results disseminated to communities of interest?
- What do you plan to do during the next reporting period to accomplish the goals and objectives?



# RPPR Required Components



## Publications & Products

- Preliminary Data?

## Patient (or Animal) Recruitment and Safety Reports

## Collaborative Efforts

- Collaborating Institution Reports
- Multi-site projects?

## Impact

- Are you producing a sustained powerful influence in your research area with your progress?



# RPPR Required Components

## Project Changes, Challenges, & Problems

- Changes in approach and reasons for change
- Actual or anticipated problems or delays and actions or plans to resolve them
- Changes that have a significant impact on expenditures
- Significant changes in use or care of human subjects, vertebrate animals, biohazards, and/or select agents

## Financial / Budgetary Reports

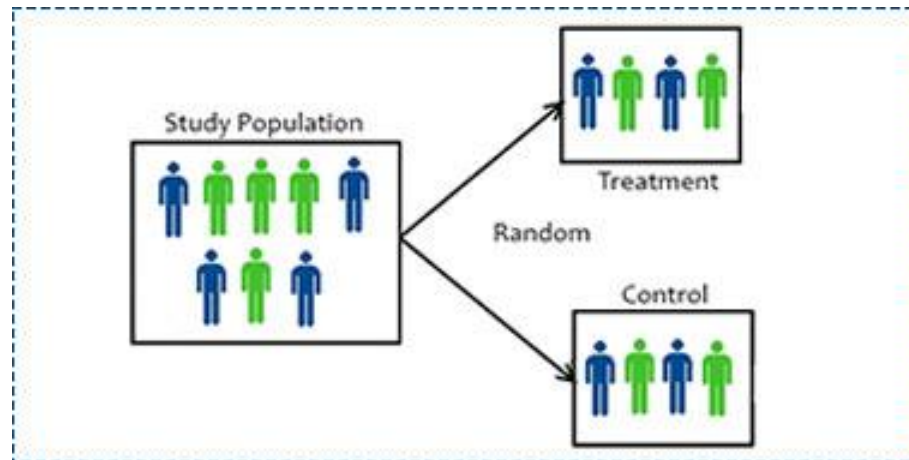
## Modifications &/or Future Plans?



# Core Reporting Standards - Manuscripts

## 1. Randomization

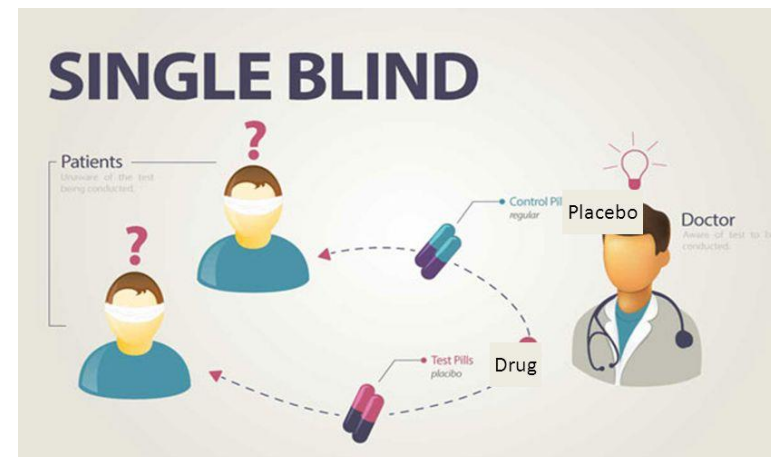
- Animals &/or human subjects should be assigned randomly to the various experimental groups, and the method of randomization reported.
- Data should be collected and processed randomly or appropriately blocked.



# Core Reporting Standards - Manuscripts

## 2. Blinding (single, double, triple)

- **Allocation concealment:** Investigator(s) should be unaware of the group to which the next animal taken from a cage will be allocated.
- **Blinded conduct of the experiment:** Animal caretakers and investigators conducting the experiments should be blinded to the allocation sequence.
- **Blinded assessment of outcome:** Investigator(s) assessing, measuring, or quantifying experimental outcomes should be blinded to the intervention.



# Core Reporting Standards - Manuscripts

## 3. Sample Size & Estimation

- An appropriate sample size should be computed & utilized
- The statistical details of computation should also be reported, including variability measures

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

# Core Reporting Standards - Manuscripts

## 4. Data Handling

- Rules for stopping data collection should be defined in advance.
- Criteria for inclusion and exclusion of data should be established prospectively.
- How outliers will be defined and handled should be decided when the experiment is being designed, and any data removed before analysis should be reported.
- The primary end point should be prospectively selected. If multiple end points are to be assessed, then appropriate statistical corrections should be applied.
- Investigators should report on data missing because of attrition or exclusion.
- Pseudo replicate issues need to be considered during study design and analysis.
- Investigators should report how often a particular experiment was performed and whether results were substantiated by repetition under a range of conditions.

# 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

## *Competition*



**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, ...

# If P&R is so tough, why bother?

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
- Reporting some results, but not all results
- “Spinning” of unexpected or undesirable results
  - *Attributed to sampling or measurement errors*





# Reporting Biases associated with P&R

## Publication Bias

- Essentially this is non-publication of results
- Typically due to failure of an intervention
  - *Lack of “positive” or “significant” results*

## Outcome Reporting Bias

- **AKA: Expectation Bias**
- Selective reporting of results
- Modification of hypotheses to fit findings
- Less likely to report adverse outcomes
  - *Suppression*
  - *Highly problematic for drug & device trials*



# Reporting Biases associated with P&R

## Citation Bias

- Tendency to cite positive findings more frequently
- May lead to perception that an intervention is more effective than it truly is, due to differential in number of citations
- Over-representation of positive findings

## Location Bias

- Refers to journal of publication & impact factors
- Studies with “positive” and “significant” results tend to be
  - *Published in journals with higher impact factors*
  - *Published in journals with better access (eg. indexed)*

19th century scientist

I must find the explanation for this phenomenon in order to truly understand Nature...



21st century scientist

I must get the result that fits my narrative so I can get my paper into Nature..



# Reporting Biases associated with P&R

## Language Bias

- Publication of positive findings in a specific language
  - *e.g. English*
- Non-significant results may be published in non-English language journals
- May impact meta-reviews and systematic review results

## Time Lag Bias

- Rapid publication of exciting, but not full results
- Delay in publication of negative or non-significant findings
- Delayed publication can also occur if a PI is trying to boost “productivity” under a specific grant



# Reporting Biases associated with P&R

## 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
- Some sponsors require PIs to waive the right to publish findings that do not support the sponsor's interests
  - *Associated with publication bias & outcome reporting bias*
- Study design may be flawed from the start



# Strategies in Addressing Bias in P&R

Build

... a case in which negative results can provide a positive impact on the evidence base

Don't suppress

... results, particularly negative results or "non-significant" results

Don't rush or delay

... publication, also don't "dual submit"

Avoid

... publishing the same results in more than one manuscript unless there is a very good reason to do so (new analyses, etc.)

Consider

... the impact factor, scope, and audience of the journals you submit to (*International? Clinical?*)

Try

... to balance the story you tell with respect to citations

Use

... references from journals that adhere to NIH R&R guidelines

# 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

## Report on the following:

- Randomization techniques
- Use of blinding
- Sample size estimation
- Data handling



***Look for these hallmarks in the literature you use to build your studies!***

# Strategies in Addressing Bias in P&R

## Use ALCOA Principles for Managing Data Quality

- Atributable
- Legible
- Contemporaneous
- Original
- Accurate

## Maintain Data Integrity

- Complete
- Consistent
- Enduring
- Readily Available



# Strategies in Addressing Bias in P&R

Know

... the strengths & weaknesses of your team

Know

... your deadlines

Know

... your resources (*Do you have administrative support? How much? What type?*)

Know

... what components are needed for reporting

Familiarize

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

# A New Year's Resolution...

*What can you (&/or your lab) do this year to improve your relationship with publication, reporting, & bias?*

Come up with 2 - 3 resolutions with implementation strategies to share & discuss with your breakout group.

