Are we ready for Open Science?

*On the spirit is willing, the flesh is weak*

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Open Science

- Open data
  - Open Resources
  - Reproducibility
  - Altmetrics
- Open access
  - Open Source Code
  - Open Assessment
- Citizen Science
  - Public Engagement
  - Public Involvement
  - Open Participation
  - Co-Creation
OS: Access as in Publishing
OS: Access as in data & software
OS: illusory access = Openwashing
OS movement: evolution or revolution?

1. Create a Sense of Urgency
2. Build a Guiding Coalition
3. Form a strategic Vision & INITIATIVES
4. Enlist a Volunteer Army
5. Enable Action by Removing Barriers
6. Generate Short-Term Wins
7. Sustain Acceleration
8. Institute Change
OS: resistance to change
OS: resistance to change

Figure 1.2 Time spent (average)

Personal experience (feeling):
OS: resistance to change

Researcher degree of freedom

1. Which of these paths should I take?
   - The researcher comes to a fork in the garden of forking paths where they must make a decision.

2. Do I know all my options? Are there any paths that would lead me astray?
   - The researcher surveys all possible analysis paths, weighing their options, and preempting problems later on.

3a. I will apply a rule to decide between the possible paths.
   - The researcher follows a procedure (e.g., exclusion criteria, desired sample size) to systematically choose analysis paths.

3b. Circumstances aren’t ideal. I guess this path will do.
   - The researcher ignores possible analysis paths, gambles on a potentially misleading path, or rationalizes why paths were not feasible.

Reduce

Decision Point

Acknowledge

multiplexing

Suppress
OS: Confirmation bias

No culture of FAILURE
Publication bias & lack of data sharing
~92% positive & ~70% failure
Fanelli (2010); Wicherts et al. (2006)

Lack of replication
1 in 1000 papers
Makel et al. (2012)

HARKing
~50-90% prevalence
John et al. (2012); Korr (1998)

P-hacking
~50-100% prevalence
John et al. (2012)

Low statistical power
~50% chance to detect medium effects
Cohen (1962); Sedlmeier & Gigerenzer (1989); Bezeau & Graves (2001)
If I have seen further than others, it is by standing upon the shoulders of giants.

Isaac Newton
OS: Culture of Academia

DNA: Franklin, Crick & Watson
1953
OS: anti-OS incentives

Quality vs. Quantity
OS: no sense of urgency
Nudging and boosting Open Science

• FAIR
• CRediT – 14 contributor roles incl data curation, software!
• Be Bayesian – transparently update your decisions
OS movement: evolution!
OS movement: evolution!

1. Create a Sense of Urgency
2. Build a Guiding Coalition
3. Form a strategic Vision & INITIATIVES (Plan S)
4. Enlist a Volunteer Army (eg replication crisis, SIPS)
5. Enable Action by Removing Barriers (OSF, Dataverse, …)
6. Generate Short-Term Wins
7. Sustain Acceleration
8. Institute Change
Happy to take your questions
How to write a detailed (and replicable) method section: [https://www.youtube.com/watch?v=CtIOOQmyY](https://www.youtube.com/watch?v=CtIOOQmyY)