

Why Do Good Researchers Make Bad Choices?

Not all threats to research integrity come from deliberate fraud. Often, they come from **lack of rigour, honest mistakes, or simply not knowing better**. That's where **Questionable Research Practices (QRPs)** come in. While fraud involves deliberate actions like fabrication, falsification, or plagiarism, Questionable Research Practices are more subtle — and more widespread. They're often unintentional, but they still compromise the credibility of research.

What Are Questionable Research Practices?

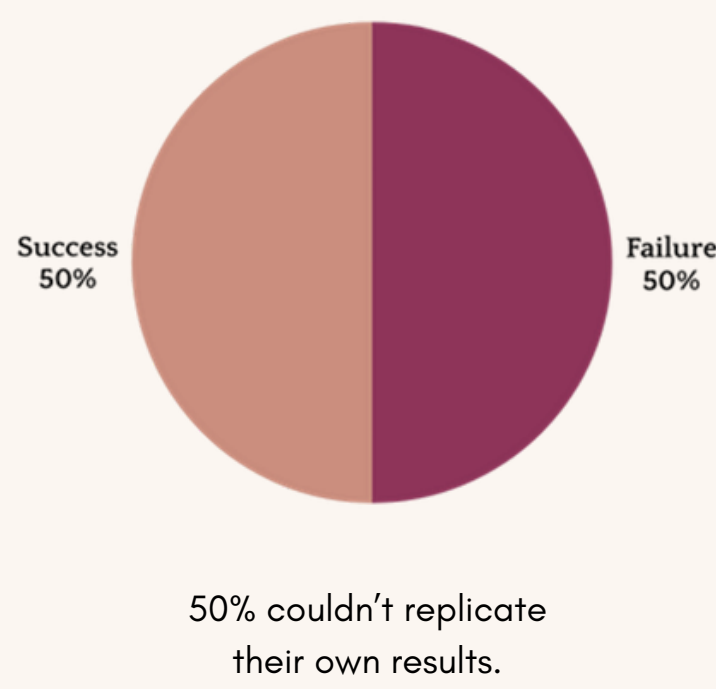
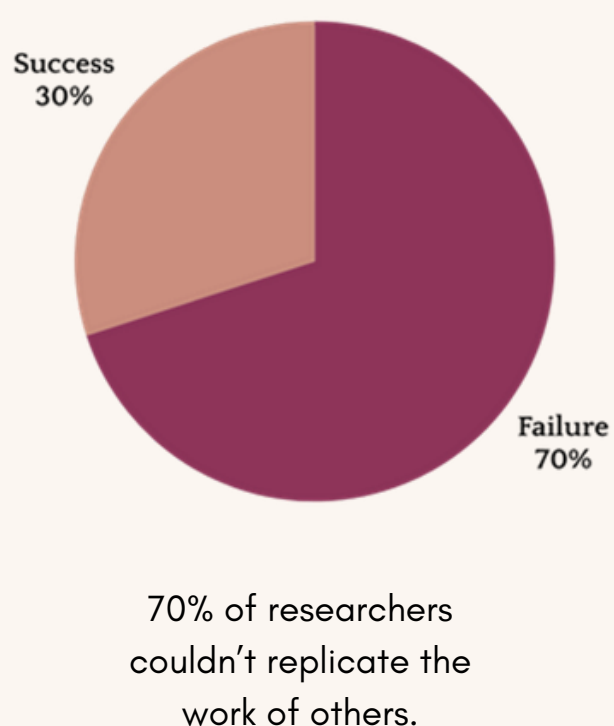
Questionable Research Practices (QRPs) are behaviours that deviate from established best practices, even if they stop short of outright fraud. They may be used—consciously or not—to achieve desirable results, but they do so at the expense of research integrity. By introducing bias into the design, analysis, or reporting of research, Questionable Research Practices can undermine trust in scientific findings and erode confidence in the broader research enterprise.

Examples of Questionable Research Practices?



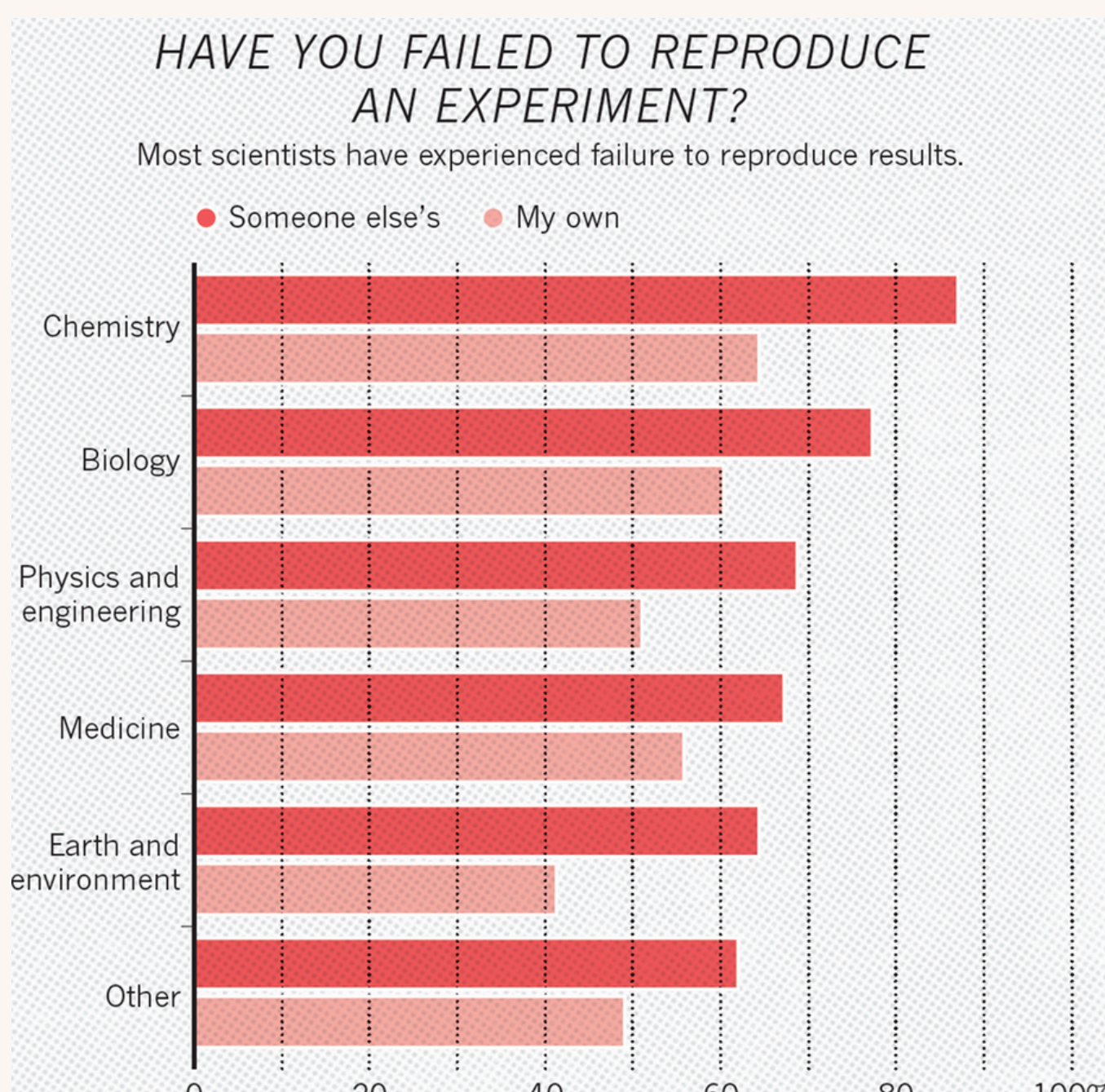
Why It Matters: The Reproducibility Crisis

Engaging in Questionable Research Practices (QRPs) doesn't just affect individual studies—it contributes to a much wider problem known as the **Reproducibility Crisis**. In 2016, Nature surveyed over 1,500 researchers across disciplines to understand their experiences with replicating results. The survey found that over **70% of researchers had failed to reproduce another scientist's experiments, and more than half had failed to reproduce their own experiments**.



A closer look at the data shows that these failures occurred across every major discipline—from chemistry and medicine to psychology, engineering, and physics. This pattern reveals that the reproducibility crisis is not limited to a particular field or method.

It reflects deep, systemic issues in how research is designed, analysed, and shared.



Questionable Research Practices (QRPs) are a key driver of this crisis. Practices like selective reporting, p-hacking, and poor documentation inflate false positives, hide negative results, and make it impossible to trace or reproduce findings. Even when not intentional, these behaviors create a scientific record that can't be trusted or verified.

What are the Consequences?

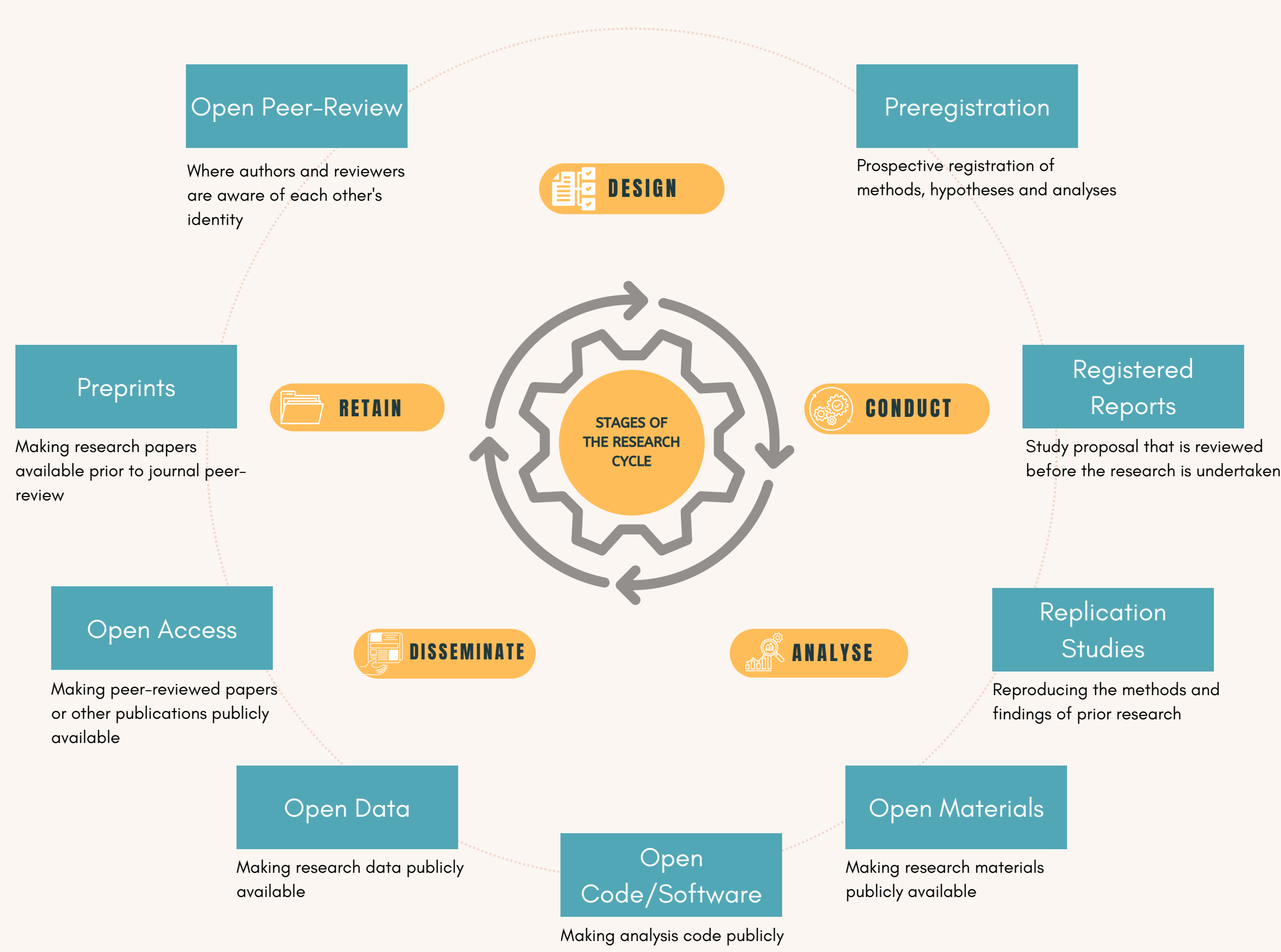
- Wasted time and resources
- Damaged public trust
- Slowed scientific progress
- And an overwhelming burden on researchers trying to build on shaky foundations

This is why addressing Questionable Research Practices matters—not just for ethical reasons, but for the basic reliability of science.

Open Research Practices Across the Research Cycle

Open Research Practices (ORPs) offer practical solutions to the challenges posed by QRPs. They promote reproducibility, transparency, and rigour by giving researchers structured ways to improve their work at every stage.

Remember the Research Life Cycle? We can now map key Open Research Practices onto the stages of the research cycle, showing how openness can be integrated into real workflows.



• Planning Stage

Preregistration and Registered Reports help define your research questions and methodologies before data collection begins. This reduces selective reporting and publication bias by committing to your analytical plan in advance.

• Data Collection and Analysis

Sharing Open Materials, Open Data, and Open Code makes your tools, datasets, and analyses accessible. This supports collaboration, verification, and reuse—key ingredients of rigorous science.

• Reporting and Dissemination

Preprints, Open Access, and Open Peer Review increase the visibility and reach of your findings. They promote faster dissemination and ensure that publicly funded research is publicly available.

From Problems to Prevention: How ORPs Counter QRPs

Let's take a closer look at how specific Open Research Practices actively prevent or reduce the risk of Questionable Research Practices, starting with one of the most powerful tools: Preregistration.

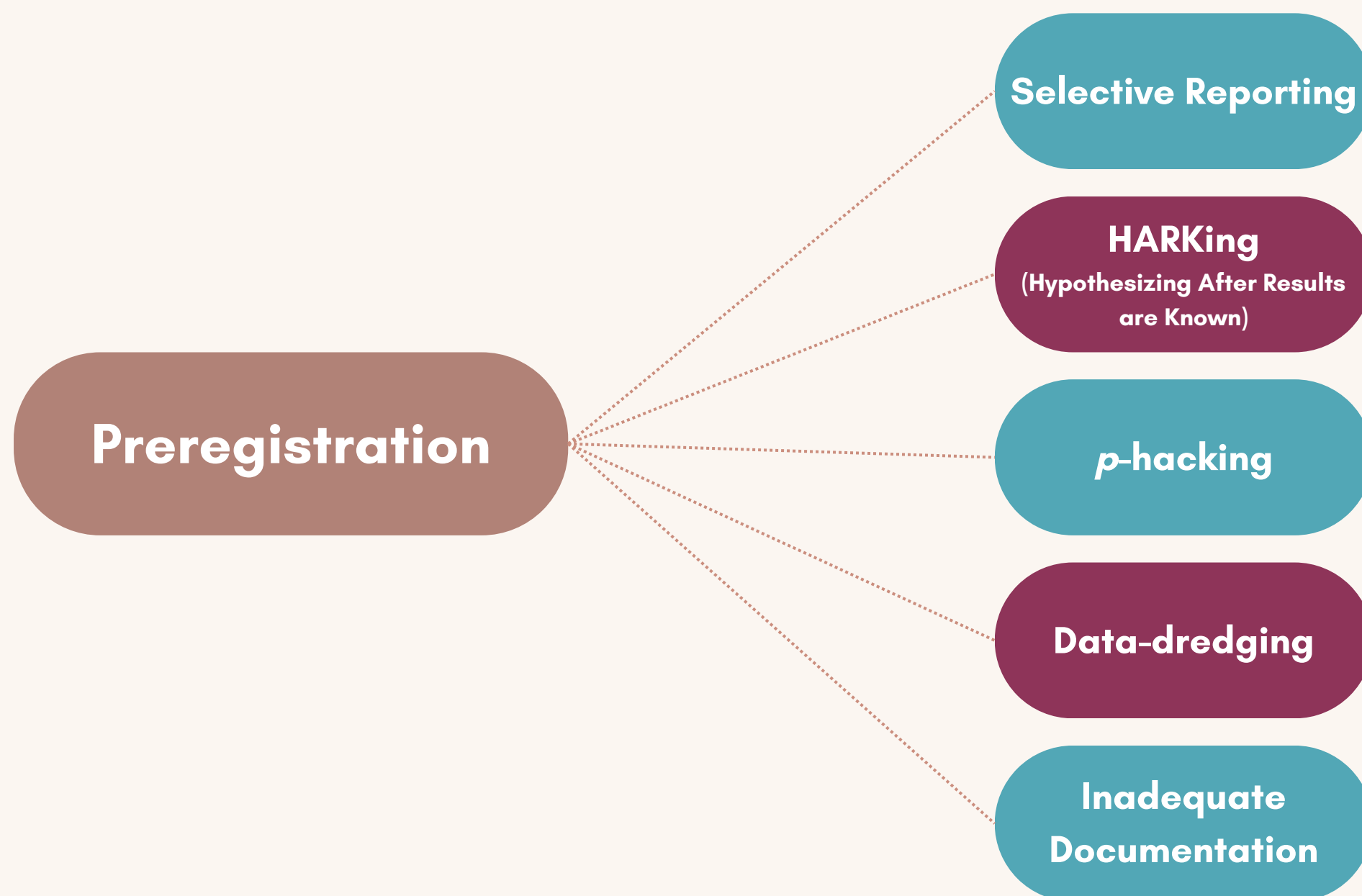
Preregistration: Locking in Rigour from the Start

Preregistration is one of the most effective strategies for promoting research integrity.

By documenting your **research question, hypotheses, methods, and analysis plan** before data collection begins, you create a clear and transparent roadmap that guards against common Questionable Research Practices.

Here's how preregistration helps:

- **Prevents Selective Reporting:** You've committed in advance to reporting all planned outcomes, not just the ones that support your hypothesis.
- **Stops HARKing** (Hypothesizing After Results are Known): Your hypotheses are recorded before seeing the results—no room for retrofitting narratives to fit outcomes.
- **Blocks P-Hacking and Data Dredging:** Because you've specified your analysis plan, there's less temptation or flexibility to test multiple options until you find something statistically significant.
- **Improves Documentation:** The preregistration process requires clear articulation of study design, methods, and planned analyses—boosting transparency and reproducibility from the outset.



Preregistration doesn't limit your creativity—it separates exploratory from confirmatory work, helping others (and yourself) interpret your findings with the right lens.

Open Materials, Data, and Code: Safeguards Against Research Misconduct

Just as preregistration helps protect the planning phase of research, sharing your materials, data, and code strengthens the analysis and reporting phases. These practices are central to reproducibility—and powerful tools against QRPs.

Here's how they help:

- **Failure to Share Data, Materials, or Code:** Open sharing removes barriers to verification. It allows others to inspect your methods, rerun your code, or reuse your materials—making your findings more credible and your process more transparent.
- **P-Hacking and Data Manipulation:** When raw data and analysis scripts are publicly available, it's much harder to tweak analyses behind the scenes or hide unjustified choices.
- **Sharing your data** encourages analytical accountability and reduces the temptation—or even the possibility—of manipulating results to chase significance.
- **Inadequate Documentation:** Open materials and code repositories often include protocols, README files, and structured metadata. This promotes clarity and helps others reproduce your workflow step by step.



In short: openness is not just about access—it's about accountability, clarity, and trust. Making your research artefacts available doesn't just help others. It strengthens your own work, making it more likely to stand the test of time—and scrutiny.

Openness as a Safeguard and a Standard

- Questionable Research Practices often arise not from bad intentions, but from subtle pressures, knowledge gaps, and norms that fail to support transparency.
- Open Research Practices offer a principled and practical way forward.
- They don't just protect against bias—they actively strengthen the clarity, rigour, and trustworthiness of the research process.
- Even adopting one open practice—like preregistration—can be a meaningful step toward better science.

The goal isn't perfection. It's progress.

As you continue through the training, you'll encounter other practices and tools that can support openness in your own work. Some may already align with what you do. Others might challenge you to reconsider habits you've taken for granted.