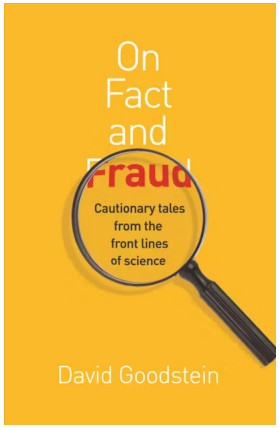
Just Because You Can, Should You?
An Interactive Discussion on Ethics in a Scientific Context



APS "The Back Page" Article June 2010 by: D. Goodstein

link to recording

link to slides

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Research Discussion - FRIB 1200
2026-01-15 11:00-12:00
https://msu.zoom.us/j/95397358809 (ethics)

SCAN ME

Poll Everywhere

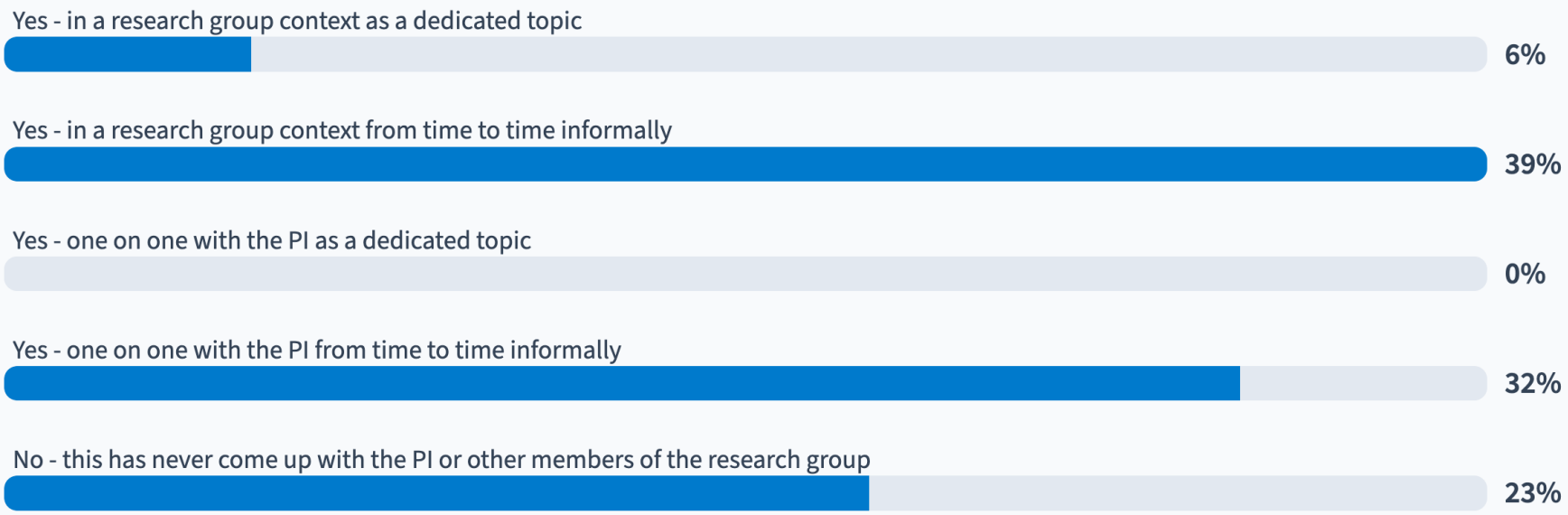
When poll is active respond at **PollEv.com/jaideepsingh305**

I am cheap so the "polls" freeze after ~40 responses since this is the free version.

After some "polls," which are intended to be ambiguous – I'll ask you to discuss with your nearest neighbor(s).

Have you ever taken a course/training that discussed scientific ethics?

Have you ever discussed scientific ethics within the context of a research setting (i.e. outside of a course/training setting)?

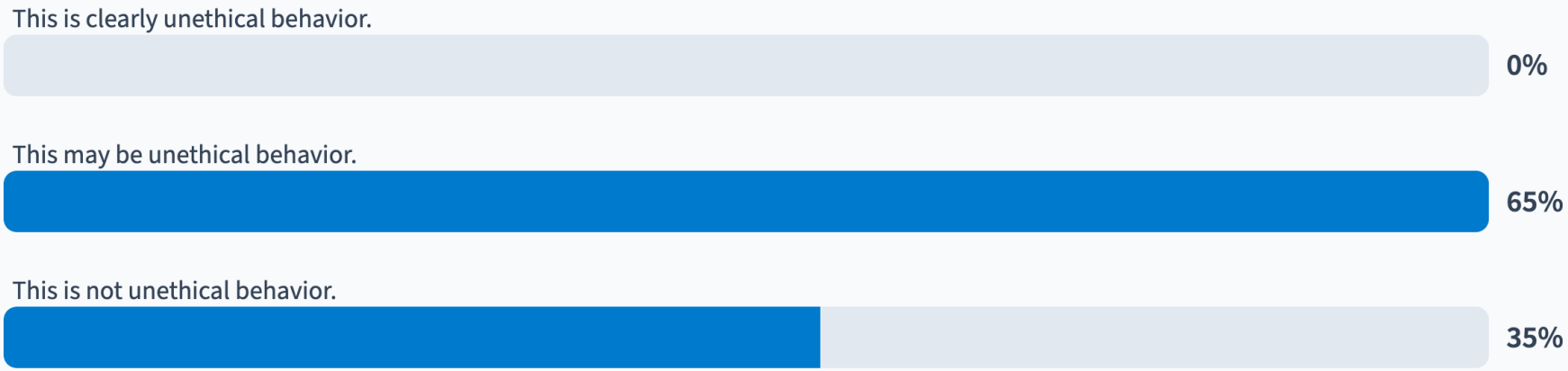


What word or phrase do you associate with "scientific ethics?"

What word or phrase do you associate with unethical behavior?

What word or phrase do you associate with ethical behavior?

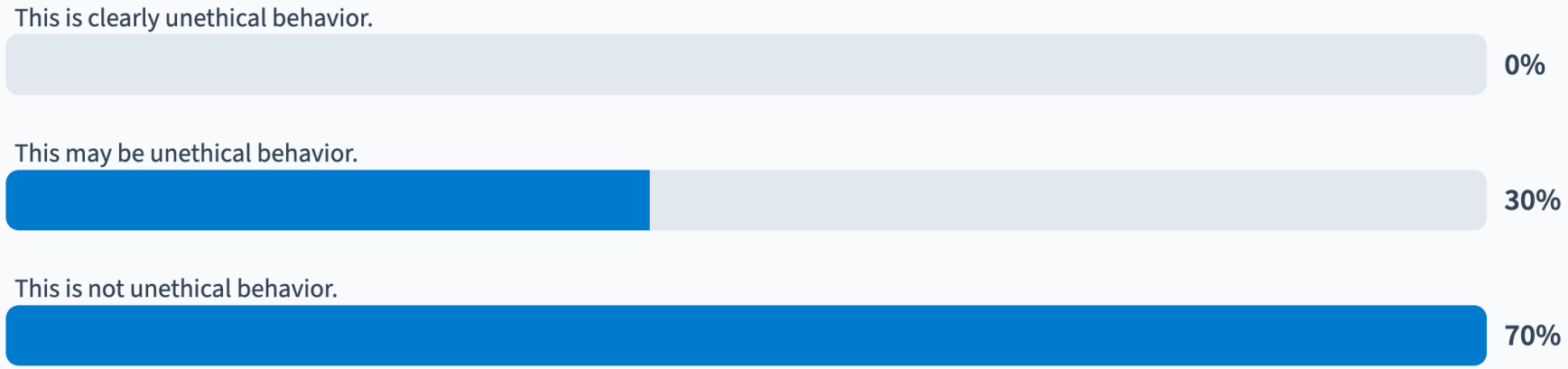
You present a plot in an experimental paper that consists solely of simulated data.



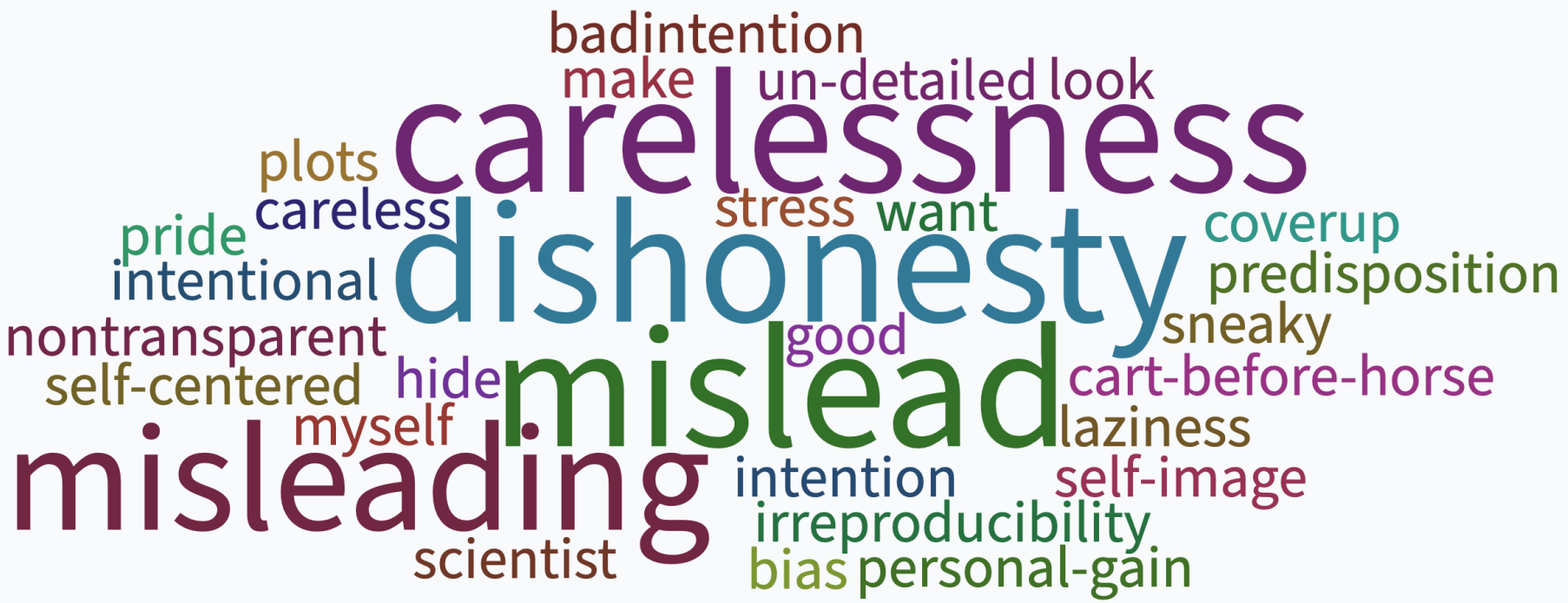
You present a plot in a experimental paper that does not include all of the data taken.

You present a plot of a voltage time series (voltage vs. time) where the data points have been shifted away from the values in the data file recorded by an automated data acquisition system.

You make a scatter plot of data involving two variables and overlay the data points with a line (y = m*x+b).



What are the potential indicators, intentions, rationalizations, and/or common themes associated with unethical behavior?



Questions That We Did Not Have Time For...

- You make a scatter plot of data with uncertainties and you move the data points around within the stated uncertainties.
- In the methods section of your paper, you do not include all of the steps that you carried out.
- In the conclusion/outlook section of your paper, you do not explicitly state any of the limitations of your technique that would call into question your main assertions.
- You include a co-author on a paper that did not contribute to the research.
- You include a co-author that did contribute to the research.
- A sponsor funds your fundamental scientific research. The sponsor is motivated to support your research for a specific use-case that is known to you but is not the use-case that motivates your interest in the research.

Goodstein Framework for "Scientific Fraud"

"In my experience three factors are nearly always present whenever fraud occurs in science....

1. *The scientist involved is under career pressure,*
2. *[they] think they know how the experiment would come out if it were performed properly, and*
3. *The research is being conducted in a field where precise reproducibility is not expected.*

It is by no means true that fraud occurs whenever these three factors are present. The factors are quite common and fraud is thought to be rare in science" APS Back Page June 2010 Goodstein

1. The **circumstances** that forces a scientist to **succumb to temptation** because of a lack sufficient self-discipline and self-confidence
2. The **rationalization** a scientist provides to themselves which reframes the unethical behavior as simply a **"convenient short-cut"** that they or someone else will confirm the results later – a form of self-deception
3. The **perceived safety net** that allows them **plausible deniability** in the event that they or someone else cannot confirm the results later – a form of self-preservation

Action Items For The Community (Point 1)

1. **Be curious, not judgmental**: when a case of scientific fraud becomes a big news item, have a thoughtful conversation within your research groups about how the offender could have slowly and systematically rationalized their behavior that have led up to that point – use yourself as an example – in other words ”imagine how it could have happened here.”

2. **Forgive** the smaller mistakes but use them as teachable moments – **people are not unethical, behavior is**! Forgiveness does not mean no consequences; it means limited corrective-based consequences that are not permanent.

3. **Simple (but not easy): change the incentive structure of merit and reward in science** – first small step: send your ”reproducibility studies” and “negative or null results” to the new APS journal Open Science (launched last month) – this will hopefully bring more balance to what type of research is valued and shift how scientific impact is quantified and measured.

Action Items For The Individual (Points 2 and 3)

JTS Addendum to Goodstein Framework: in every detailed study of scientific fraud, it was discovered later that the offender had a long track record of ever-increasing unethical behavior. They all started small, sometimes unintentionally (**Quiz Show**), finding out that there were seemingly no negative consequences until their behavior escalated into epic career-ending proportions.

Think of acting ethically (*or unethically*) is like **"training a muscle"** which requires **deliberate practice**:

1. Every once in a while, **imagine credible circumstances** that you could find yourself in where you **might not** have enough self-discipline and self-confidence to **resist temptation**

2. Routinely **remind** yourself of the **corrosive effect** of making seemingly **small** and "consequence-free" unethical choices that could very well grow in time

3. Periodically **self-reflect with brutal honesty** on your **choices** through the lens of ethics and **document**:
   - your ethical **successes** as examples of what went right - this helps builds up your **pattern of good habits** and self-identity as a scientist – think of yourself as a scientist who is **highly ethical (a defining trait)** as opposed to highly intelligent/creative/good at math (merely *correlated* traits)
   - your ethical **failures** and how to recognize these types of challenging choices and failure modes faster in the future - this helps build up your **self-discipline and self-confidence**

Final Take Home Message

The incentive structure of Science
is *not inherently* conducive to ethical behavior,
so one *must proactively* choose to **act ethically**,
which is *The One Defining Trait* of the Platonic Ideal Scientist.

To do so, one must maintain *constant vigilance* and
build and grow a pattern of **good habits**,
self-discipline, and
self-confidence
without self-deception.

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