Whose null hypothesis?

Statistical evidence of sex bias in a campus sexual-misconduct case

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The case

- A male student, expelled by a large US university for sexual misconduct, sued the school
  - alleging its Title IX investigation was **biased against men**.
- The plaintiff's economic experts showed the university found **far more males than females** in violation, and that the gap was **statistically significant**
  - which they offered as proof of bias.
- Our task, for the defense: is a sex difference in findings *evidence of bias* or *exactly what one should expect*?

The whole case turns on one choice made before any data is touched: the null hypothesis.

The statistical question

- A proportionality test compares **actual** allegations by sex against the **expected** allegations under a null.
- The null is where "no bias" gets defined, it carries every substantive assumption.
- The plaintiff's null: **men and women offend at equal rates**, so any male excess is bias.
- That is the right null *only if* men and women commit sexual misconduct at equal rates.

They do not, and the research says so plainly.

What the research says: the base rate

Category	M : F propensity	Source
Sexual assault (contact & penetration)	$33.5\times$	DOJ; FBI NIBRS
Sexual harassment	$3.1\times$	US MSPB
Sexual exploitation	$1\times$ (assumed equal)	none available

- Federal and peer-reviewed data: males are the instigating party in **roughly 97%** of campus sexual assault.
- These are **not our numbers**: they are the published base rates the right null must encode.

The right null, applied

	Male	Female	Ratio	Expected F	Difference
Sexual contact	39	1	33.5	1.2	-0.2
Sexual penetration	28	2	33.5	0.8	$+1.2$
Sexual harassment	45	11	3.1	14.5	-3.5
Sexual exploitation	16	12	1.0	16.0	-4.0
Total	128	26		32.5	-6.5

- Under a **base-rate-adjusted null**, expected female allegations $\approx$ **32.5**; actual $=$ **26** — females are if anything *under*-represented.
- A z-test against *equal rates* **is** significant — but that only says the data differ from a null **known to be false**.

A significant result against the wrong null is a false positive by construction.

Regression: the on-point test

- The bias claim is about **adjudication**: given an accusation, are men found responsible or sanctioned more? The base rate is about *who is accused*; the school does not control that.
- Test it directly: condition on the **case file**: C-allegation counts, prior incident reports, co-occurring A/B charges, repeat appearances.
- This needs **no external base rate**, no contested prior. The only question: does **sex** add anything once the file is accounted for?

If the process were biased against men, the Male coefficient should matter. It does not.

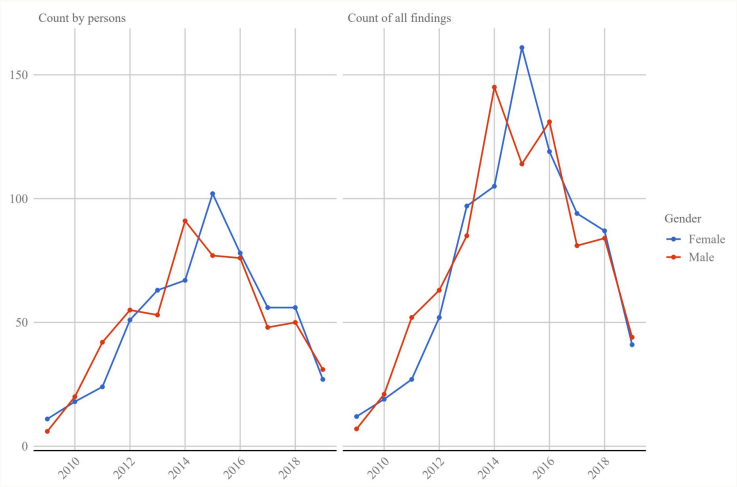
Regression results

Predictor	Found responsible (logit)	Sanction severity (mlogit)
Male	$0.119\ (0.061)$ *ns*	$0.196\ (0.317)$ *ns*
Prior A–B findings	0.266^{***}	0.384^{***}
Repeat appearance	0.025 *ns*	0.676^{***}
n	2,267	1,100

$^{***}\,p < 0.001$

- **Male** is insignificant across OLS, logit, Poisson & multinomial; in the sexual-only model it is *negative* (-0.079).
- What predicts the outcome is the **case file**, not **sex**.

The trend that wasn't



Why the plaintiff's experts found "bias"

- Their tests assumed **equal offending by sex**, the very assumption the research rejects.
- They ignored the **case-file variables** that *do* predict findings and sanctions: allegation counts, prior incident reports, co-occurring charges. Add those and **sex drops out**.
- Build a null that cannot be true, test against it, and significance is **guaranteed**.

Their finding of bias is an artifact of **null misspecification**.

The deeper tension: priors in science vs. the court

- Social scientists treat the **prior / base rate** as a *substantive input*: you must model the data-generating process before you test.
- Courts seem to prize a **"neutral"** null and read any prior as **advocacy**.
- But "equal rates" is **not neutral**, it is a strong empirical claim, and a false one.

Choosing the null is the analysis. The fight over priors belongs in the open, before the p-value.

Takeaways

1. **State the null first.** It carries the substantive assumptions, and it decides the result.
2. **"Neutral" = equal rates** is itself a contestable prior, not the absence of one.
3. **Statistical significance is cheap** against a null you have rigged to fail.
4. The robust result needs **no prior**: condition on the case file and **sex does not predict the outcome** — the same conclusion the base-rate null reaches, without the contested ratios.