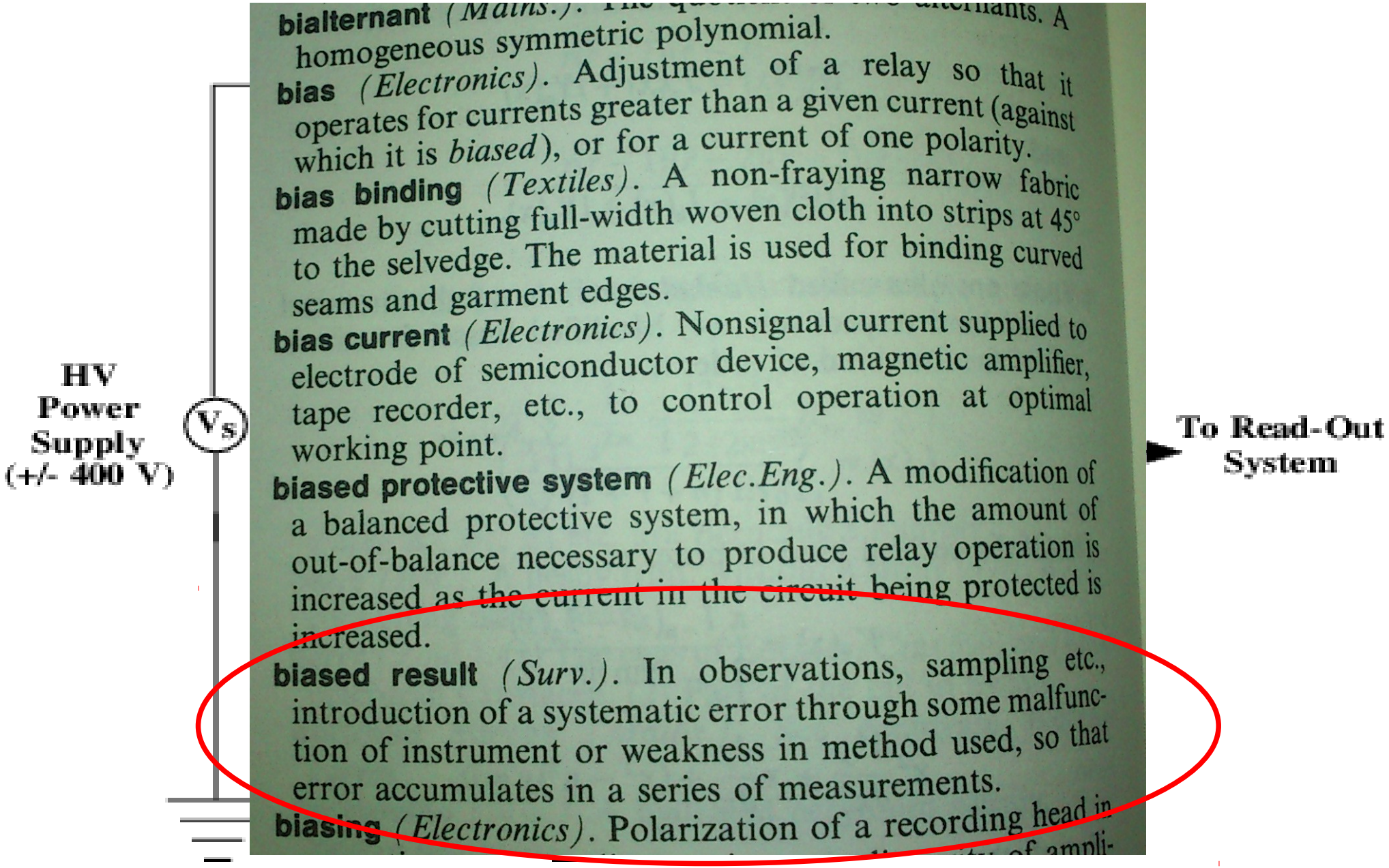
BIAS



bialternant *(Maths.)*. The quotient of two alternants. A homogeneous symmetric polynomial.

bias *(Electronics)*. Adjustment of a relay so that it operates for currents greater than a given current (against which it is *biased*), or for a current of one polarity.

bias binding *(Textiles)*. A non-fraying narrow fabric made by cutting full-width woven cloth into strips at 45° to the selvedge. The material is used for binding curved seams and garment edges.

bias current *(Electronics)*. Nonsignal current supplied to electrode of semiconductor device, magnetic amplifier, tape recorder, etc., to control operation at optimal working point.

biased protective system *(Elec.Eng.)*. A modification of a balanced protective system, in which the amount of out-of-balance necessary to produce relay operation is increased as the current in the circuit being protected is increased.

biased result *(Surv.)*. In observations, sampling etc., introduction of a systematic error through some malfunction of instrument or weakness in method used, so that error accumulates in a series of measurements.

biasing *(Electronics)*. Polarization of a recording head in

What is bias?

- Systematic Errors
- Experimenter Prejudice
- Bad equipment/experiment
- ...
- Solution: blind analyses, care, independent tests/experiments?
  - It can be topical, subjective and very rarely treated correctly...

What is bias?

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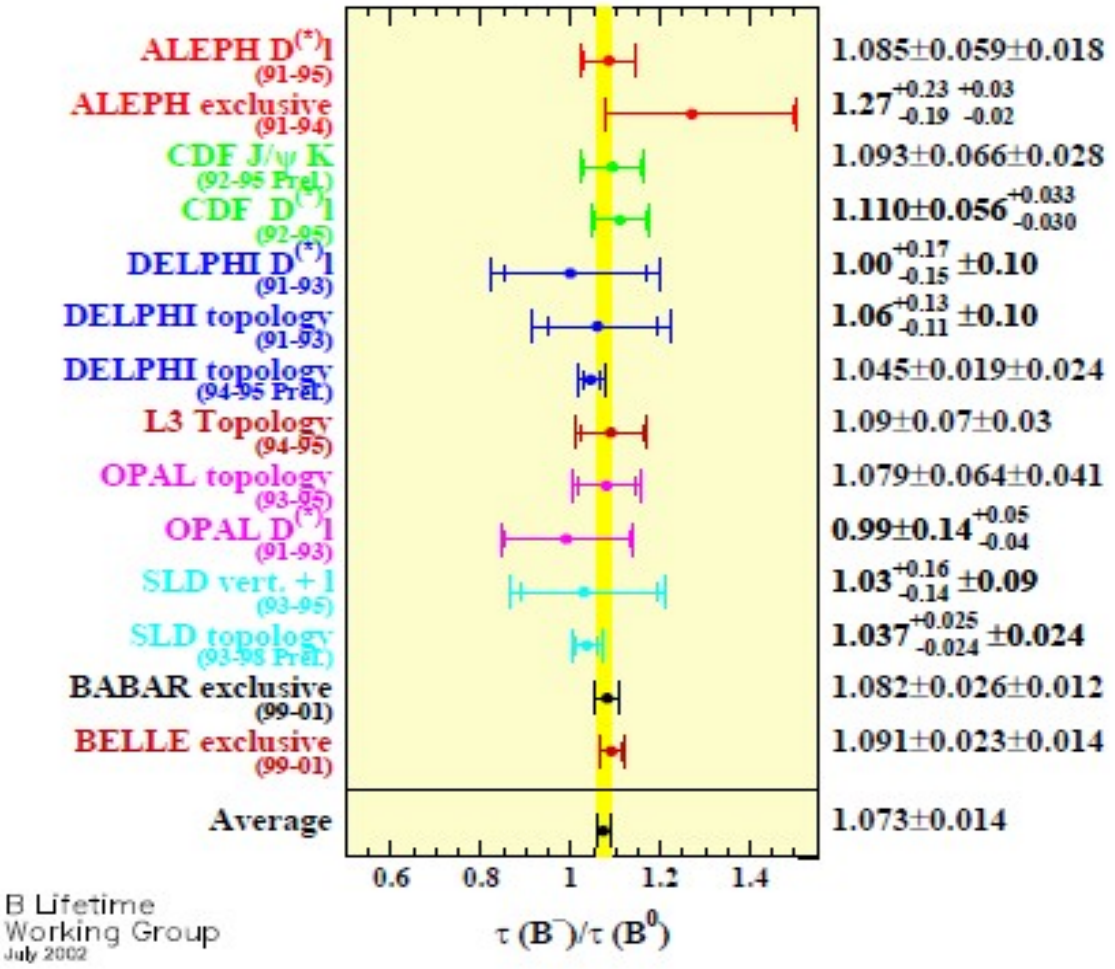
How does it effect the teaching lab?

- Students ask questions or manipulate results:
  - “what is a good resolution?”
  - “what value should I get?”
  - “what's the correct measurement?”
- Equipment:
  - Calibration of instruments
  - Experimental set-up – e.g. coincidence timing in the e+/e- experiment: same spectrum measured, but shifted smaller when coincidence applied
  - Other examples?

What's wrong with this?



1.5% Probability!

Figure 2: Summary of B meson lifetime ratio measurements. The average has a $\chi^2 = 4.5$ for 13 degrees of freedom.

Other examples

- Austerity and public spending cuts:
  - False statistics...

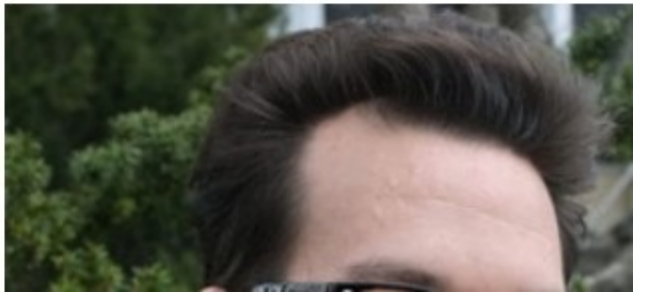
http://www.bbc.co.uk/news/magazine-22223190

19 April 2013 Last updated at 23:53 GMT

Reinhart, Rogoff... and Herndon: The student who caught out the profs

By Ruth Alexander
BBC News

This week, economists have been astonished to find that a famous academic paper often used to make the case for austerity cuts contains major errors. Another surprise is that the mistakes, by two eminent Harvard professors, were spotted by a student doing his homework.



Peer review – double blind

- Are we prejudiced if we know the people?

Double-blind peer review reveals gender bias

21 Jan 2008 | 13:54 GMT | Posted by Maxine Clarke | Category: Ethics, Systems

Double-blind peer review, in which neither author nor reviewer identity are revealed, was introduced by the journal *Behavioral Ecology* in 2001. Amber E. Budden *et al.*, in an article published in *Trends in Ecology and Evolution* this month (*Trends Ecol. Evol.* **23**, 4-6; 2008) report "a significant increase in female first-authored papers" compared with a similar journal, *Behavioral Ecology and Sociobiology*. From the authors' conclusions:

"A difference of 7.9% in the proportion of female first-authored papers following the implementation of double-blind review in BE is "http://www.nsf.gov/statistics/nsf07305/">three times greater than the recorded increase in female ecology graduates in the USA across the same time period and represents a 33% increase in the representation of female authors. Furthermore, this increased representation of female authors more accurately reflects the "http://www.nsf.gov/statistics/wmpd/employ.htm">(US) life sciences academic workforce composition, which is 37% female.

http://blogs.nature.com/peer-to-peer/2008/01/doubleblind_peer_review_reveal.html

Or not...

No demonstrated gender bias in double-blind peer review

05 Jun 2008 | 09:08 BST | Posted by Maxine Clarke | Category: Ethics, Quality and value, Systems

The Editorial 'Working double-blind' (*Nature* **451**, 605–606; 2008), also republished on this blog and stimulating more than 70 comments, referred to a study (1) that found more female first-author papers were published using a double-blind, rather than a single-blind, peer-review system. The data reported in ref. 1 have now been re-examined (2). The conclusion of ref. 1, that *Behavioral Ecology* published more papers with female first authors after switching to a double-blind peer-review system, is not in dispute. However, ref. 2 reports that other similar ecology journals that have single-blind peer-review systems also increased in female first-author papers over the same time period. After re-examining the analyses, *Nature* has concluded that ref. 1 can no longer be said to offer compelling evidence of a role for gender bias in single-blind peer review. In addition, upon closer examination of the papers listed in PubMed on gender bias and peer review, we cannot find other strong studies that support this claim. Thus, we no longer stand by the statement in the fourth paragraph of the Editorial, that double-blind peer review reduces bias against authors with female first names.

http://blogs.nature.com/peer-to-peer/2008/06/no_demonstrated_gender_bias_in.html

Even nobel prize winners...

TABLE I. Representative bins of the positron fraction as a function of energy. Errors due to *stat.*, statistical error; *acc.*, acceptance asymmetry; *sel.*, event selection; *mig.*, bin-to-bin migration; *ref.*, reference spectra; *c.c.*, charge confusion; and *syst.*, total systematic error. For the complete table, see [13].

Energy[GeV]	N_{e^+}	Fraction	σ_{stat}	σ_{acc}	σ_{sel}	σ_{mig}	σ_{ref}	$\sigma_{c.c.}$	σ_{syst}
1.00–1.21	9335	0.0842	0.0008	0.0005	0.0009	0.0008	0.0001	0.0005	0.0014
1.97–2.28	23 893	0.0642	0.0004	0.0002	0.0005	0.0002	0.0001	0.0002	0.0006
3.30–3.70	20 707	0.0550	0.0004	0.0001	0.0003	0.0000	0.0001	0.0002	0.0004
6.56–7.16	13 153	0.0510	0.0004	0.0001	0.0000	0.0000	0.0001	0.0002	0.0002
09.95–10.73	7161	0.0519	0.0006	0.0001	0.0000	0.0000	0.0001	0.0002	0.0002
19.37–20.54	2322	0.0634	0.0013	0.0001	0.0001	0.0000	0.0001	0.0002	0.0003
30.45–32.10	1094	0.0701	0.0022	0.0001	0.0002	0.0000	0.0001	0.0003	0.0004
40.00–43.39	976	0.0802	0.0026	0.0002	0.0005	0.0000	0.0001	0.0004	0.0007
50.87–54.98	605	0.0891	0.0038	0.0002	0.0006	0.0000	0.0001	0.0004	0.0008
64.03–69.00	392	0.0978	0.0050	0.0002	0.0010	0.0000	0.0002	0.0007	0.0013
74.30–80.00	276	0.0985	0.0062	0.0002	0.0010	0.0000	0.0002	0.0010	0.0014
86.00–92.50	240	0.1120	0.0075	0.0002	0.0010	0.0000	0.0003	0.0011	0.0015
100.0–115.1	304	0.1118	0.0066	0.0002	0.0015	0.0000	0.0003	0.0015	0.0022
115.1–132.1	223	0.1142	0.0080	0.0002	0.0019	0.0000	0.0004	0.0019	0.0027
132.1–151.5	156	0.1215	0.0100	0.0002	0.0021	0.0000	0.0005	0.0024	0.0032
151.5–173.5	144	0.1364	0.0121	0.0002	0.0026	0.0000	0.0006	0.0045	0.0052
173.5–206.0	134	0.1485	0.0133	0.0002	0.0031	0.0000	0.0009	0.0050	0.0060
206.0–260.0	101	0.1530	0.0160	0.0003	0.0031	0.0000	0.0013	0.0095	0.0101
260.0–350.0	72	0.1550	0.0200	0.0003	0.0056	0.0000	0.0018	0.0140	0.0152

positron fraction as a function of energy decreases by an

Why add errors in quadrature?

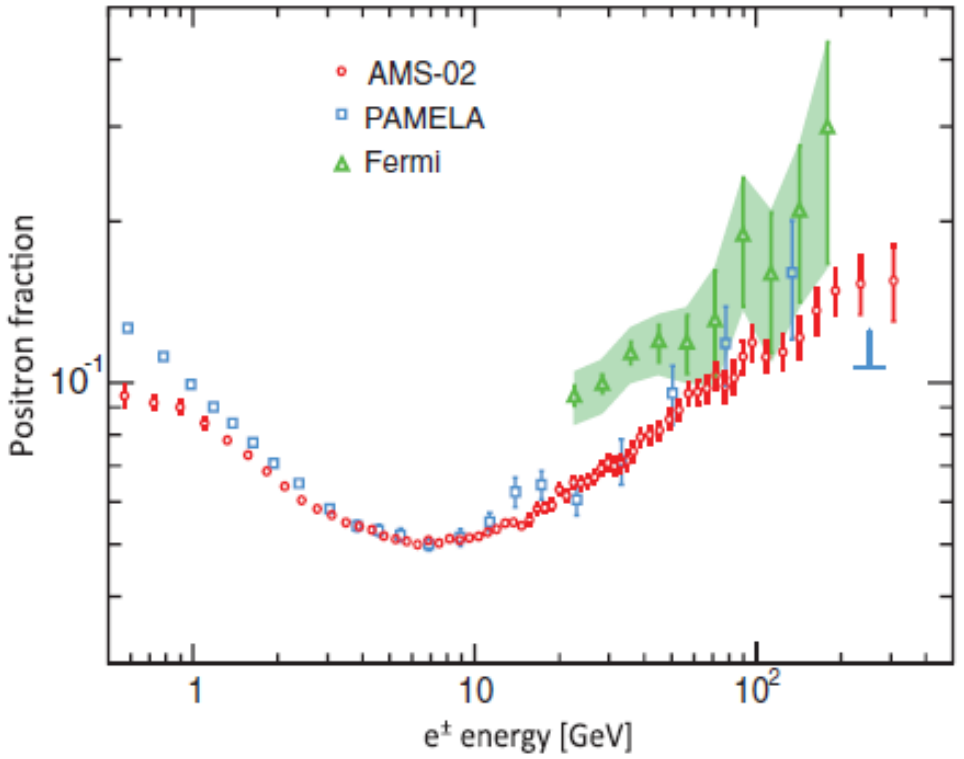


FIG. 5 (color). The positron fraction compared with the most recent measurements from PAMELA [22] and Fermi-LAT [23]. The comparatively small error bars for AMS are the quadratic sum of the statistical and systematic uncertainties (see Table I and [13]), and the horizontal positions are the centers of each bin.

Be careful...

A selected history of expectation bias in physics

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(Received 25 June 2005; accepted 10 February 2006)

The beliefs of physicists can bias their results toward their expectations in a number of ways. We survey a variety of historical cases of expectation bias in observations, experiments, and calculations. © *2006 American Association of Physics Teachers.*
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I. INTRODUCTION

> It is a capital mistake to theorize before one has data. Insensibly one begins to twist facts to suit theories, instead of theories to suit facts (Sherlock Holmes).[1]

But are we sure of our observational facts? Scientific men are rather fond of saying pontifically that one ought to be quite sure of one's observational facts before embarking on theory. Fortunately those who give this advice do not practice what they preach. Observation and theory get on best when they are mixed together, both helping one another in the pursuit of truth. It is a good rule to

emphasis is on how careful and correct reasoning leads to correct results, even if that reasoning is retrospective and ahistorical. Convoluted reasoning that was actually followed is replaced with the clearer reasoning that, in retrospect, should have been followed. Many readers will be surprised to discover that Planck was not led to quantization in an attempt to fix an "ultraviolet catastrophe" discovered by Rayleigh,[4,5] Roemer never calculated a value for the speed of light,[6] and Einstein was not primarily motivated by the Michelson-Morley experiment in his invention of special relativity.[7] These and other examples are discussed in the reviews by Brush and Whitaker.[4,5] Although this systematic bias in textbooks is understandable, it tends to eliminate cases of expectation bias. In this paper we consider some historical cases where the beliefs of physicists influenced their results.

II. OBSERVATIONS

Further Reading

- “Blind Analysis in Particle Physics” Aaron Roodman (PHYSTAT2003, SLAC, Stanford, California, September 8-11, 2003)
- “A selected history of expectation bias in physics” Monwhea Jeng (Am. J. Phys. 74, 578 (2006))