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Abelson's Paradox And The Michelson-Morley Experiment

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Letter To the Editor

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Sawilowsky, S. (2003). Deconstructing arguments from the case against hypothesis testing. *Journal of Modern Applied Statistical Methods*, 2(2), 467- 474.

Email correspondence was submitted to the Editorial Board pertaining to Sawilowsky's (2003) counter to the 'Einstein Gambit' in interpreting the 1887 Michelson-Morley experiment. To review, Carver (1978) claimed that hypothesis testing is detrimental to science, and educational research would be "better off even if [hypothesis tests are] properly used" (p. 398). Carver imagined (1993) that Albert Einstein would have been set back many years if he had relied on hypothesis tests. See Sawilowsky (2003) on why this gambit should be declined.

Carver (1993) obtained an effect size (eta squared) of .005 on some aspect of the Michelson-Morley data, although there was insufficient information given to replicate his results. Carver (1993) concluded "if Michelson and Morley had been forced ... to do a test of statistical significance, they could have minimized its influence by reporting this effect size measure indicating that less than 1% of the variance in the speed of light was associated with its direction" (p. 289).

Sawilowsky (2003) noted that the experimental results were between 5 – 7.5 km/s. Although this did not support the static model of luminiferous *ether* that Michelson and Morley were searching for, which required 30 k/s, at more than 16,750 miles per hour it does represent a speed that exceeds the Earth's satellite orbital velocity. Thus, there is no legitimate reason to minimize this experimental result, which is clearly not zero, by dubbing it with the moniker of the most famous experiment in physics with a null result.

The author of the email correspondence noted that the magnitude of the speed is impressive, but perhaps Sawilowsky (2003) invoked a Huffian (Huff, 1954) maneuver in changing from the magnitude of variance

explained to the speed in km/s. Although an invitation was declined to formalize the comment into a *Letter to the Editor*, the concern does merit a response.

Abelson (1985) sought to determine the contribution of past performance in explaining successful outcomes in the sport of professional baseball. There is no theory of success in baseball that denigrates the importance of the batting average. Yet, in Abelson's study, the amount of variance in successful outcomes that was due to batting average was a mere .00317.

Cohen (1988) emphasized "this is not a misprint – it is not .317, or even .0317. It is .00317, not quite one third of 1%" (p. 535)! Although a model that explains so little variance is probably misspecified, the response to the email query is to invoke Cohen's (1988) adage: "The next time you read that 'only X% of the variance is accounted for,' remember Abelson's Paradox" (p. 535).

References

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