February 3, 1950

Mr. John Tukey
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U. S. A.

My dear Tukey:

Thanks for your two letters with enclosures.

I have looked up the original text* and think perhaps you may have misinterpreted what I claimed to prove under Section 7. The intention is stated in the first sentence - "We shall now prove that when an efficient statistic, as defined above, exists, one may be found by the Method of Maximum Likelihood." The phrase "as defined above" refers to page 703 - "The criterion of efficiency requires that the fixed value to which the variance of a statistic (of the class of which we are speaking) multiplied by N, ten, shall be as small as possible."

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I do not think that a criterion involving the minimizing of this limit should be taken as a certain minimum property for any finite sample. Indeed, it would be most surprising if the condition were fulfilment for any finite sample unless, of course, it were fulfilled for all. Consequently, I should say our Priori in respect to Batson's problems that it must be usual for an inefficient statistic to exist at any sample size with smaller sampling variance than that of any chosen efficient statistic.

Somewhere you say also that I claim the property of minimizing the loss of information on the basis of Section 7. This is not so; it is rather on the basis of Sections 10 and 11, though these do not claim to complete the proof of this probable property of the Method of Maximum Likelihood. I think Section 11 accurately evaluates the minimum limiting loss of information in large samples when no ancillary statistics are used and shows how ancillary statistics can diminish the amount lost for sufficiently large samples.

R.W.W.

* Fisher, R.A. (1925). Theory of Statistical Estimation. Proc. Camb. Phil. Soc, 22, 700-725

R.W.W.

I am returning your material herewith and should greatly like to have your reaction to what I sent you some time ago on the sample of 3 from Laplace's distribution. I want to know whether it is claimed that the estimate with lowest variance actually contains more information than the median.

Yours sincerely,

Enc.

RAF:dm

R. A. Fisher