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My dear Ron,

      I am returning herewith your last chapter. I haven't had the opportunity of going through it in detail but won't keep it any longer now as you will doubtless be getting it off to the printer.

      I am glad to see that you have re-defined consistency, though not being tortuous-minded I had never run into the trouble which is summarised at the top of p.7.

      My chief comment on the chapter is concerning your remarks on bias at the bottom of p.2 and the top of p.3. While not in the least disagreeing with your remarks I think that something might be said about bias from the practical point of view. First, it is in fact often convenient, and also in many circumstances about the best that can be done, to take the arithmetic average, possibly with weighting, on all different estimates of the same parameter. In such cases knowledge of the bias, if any, is clearly necessary. In some cases, of course, this is merely another way of saying that one must know the mean. If, for example, estimates S of σ are given which are in fact derived from the ordinary sum of squares of deviations, squaring each estimate and weighting according to the degrees of freedom would be the appropriate method of combining the data. In other cases, however, where we are dealing with non-sufficient, or even inefficient estimates, removal of bias so that they can be combined by direct averaging is quite important. There is also another point which struck me rather forcibly when I was writing my book on sampling. That is, that we often do not know that the data follows the distribution for which the estimates are really appropriate, and frequently, indeed, know only too well that it does deviate quite considerably from this distribution. Under such circumstances we

what to/

may desire to have an estimate which is unbiased, whatever the form of the distribution. The mean square estimate of the variance of a sample, for example, provides an unbiased estimate of the variance of the population whatever the distribution. Equally, the arithmetic mean of the sample provides an unbiased estimate of the mean of the population, whatever the form of the distribution.

There are one or two other general points not particularly in connection with this chapter that have struck me.

1.   Alternative tests. From the practical point of view it might be worth discussing the logical position of rapid tests of significance and also such tests as the permutation test. A simple example is given by the test of the mean by

> (a) the t-test.
>
> (b) The sign test.
>
> (c) The permutation test.
>
> (d) The t-test with the estimation of S from the range.

(b) I use myself for the rapid inspection of data, as, I imagine, do all practising statisticians. (d) is widely recommended in certain quarters.

2.   It is sometimes claimed that if the t-test, for example, is upset/ because the argument that the original population was normally distributed is not correct, then the composite hypothesis is disproved. The experimenter, however, is not usually in the least interested in ~~the composition of~~ the form of errors and would in fact frequently be ready to admit that the errors were not exactly normally distributed.

the distribution

3.   I feel that it might be emphasised that the result of a test of significance to be useful in scientific research should carry with it a statement of the sensitivity of the test. This would be a discouragement to those who tend to say that if the results are not significant there is therefore no difference.

These are all practical points connected with the practical use of tests of significance.

My secretary has reminded me that I have done nothing about the translation for Dugué. I am sorry I haven't written about this. Unfortunately Pauline has been rather sick - in fact she has been in a nursing home for three weeks, though is out again now - and is only just capable of applying her mind to these matters. She tells me that she will be able to look at it next week and will let you know what can be done. She would have to do it personally as she is not now connected with any translation service.

Kindest regards,

Yours,

Frank.

Sir Ronald Fisher