

12th March 1934

Whateley Carrington Esq.,
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My dear Whately Carrington,

P derived from W/WP is the chance of getting such big differences as you get in the word totals on the hypothesis that if you try the list of words on a large number of people the average reaction to all words will be the same. The opposite hypothesis is that some words have a general tendency to induce high or low reaction times, and this view is confirmed when P is small. The hypothesis is really not so interesting for your purpose I think as the one tested by WP/OWP which is that whatever differences there may be among words people do not differ in their reaction more from each other than they do from themselves on different occasions. Of course if some words do generally induce longer reaction times than others this fact may equally be stated in the form that the human race show inter se some general similarities in their reaction to different words but particular

persons might show such similarity even if this were not the case.

If your data were not adjusted to make total reaction on all occasions the same which should have a similar test from O/OW the hypothesis being now that all occasions would give the same average reaction to a sufficient sample of words, and for W/OW testing the hypothesis that all words gave the same average reaction if tested on a sufficient number of occasions, personalities being totalled and therefore equalised for these two tests.

Your tests on L-E, F-J and F-E show that L and E may be identical, but that F differs significantly from J and E. If the other tests show insignificant differences, I suppose E, J and L must be indistinguishable, but F differs from them.

My point about the low probabilities is simply this, an event with probability $1/100,000$ from a certain hypothesis is certainly 1000 times less probable than one $1/100$ on the same hypothesis, supposing that hypothesis is true, but the test which gives 0.01 is in the ordinary way sufficient to show that it is not true i.e. the basis of the calculation has fallen away. In fact, having found probability .01 you knew how to get at will the probability .0001 merely by increasing

the bulk of your data three-fold i.e. as a good experimentalist supposing that your observations are really capable of repetition.

By the time you get my letter I expect you will have already done all the work needed for pooling the three degrees of freedom between the four personalities and all the other triplets that this generates.

I have gone "Head Justice" and jotted down single work analysis of these two cases. They do not agree exactly with yours, but as far as I can see, you have the thing in principal. The sum of the squares for O, P and OP may be added for all words giving respectively $O \times OW$, $P \times PW$, and $OP \times OPW$ with, if there are 74 words 74×4 , 3, and 18 degrees of freedom. From the totals of all the words one can derive, by an analysis exactly similar to that used for individual words the portions O, P and OP and subtracting these, still using sums of squares obtain OW , PW and OPW with 73×4 , 3 and 18 degrees of freedom. I think you really must have done all this in effect in comparing the personalities by pairs for your results for six pairs added together must, I suppose, give just twice the totals for the three degrees of freedom of personality and the same in all the other items which involve P.

If one personality is going to stand out from the other three it is a great advantage that you have done it by pairs, though probably pooling the results in OWP, for example, would give a better basis of estimating error for all the tests. However, I will not dogmatise on this as any great discrepancy in values of O, P, W, for different pairs might, perhaps give a clue to some psychological points you have in mind, which you would not get without the separate values.

Yours sincerely,