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March 3, 1970

Professor John W. Tukey
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Dear John:

I have read your nice statement on the draft lottery. Naturally I will suggest a few things.

Page 1, 2nd ¶, line 1. I don't like the "wise". We could meet these principles adequately by carrying out a more careful drawing than has so far been used--. I don't want to be in the position of implying that it would be wise to redraw the draft numbers. I think a whole new kettle of trouble will arise from that. I only want to talk about how to do a careful drawing not whether it is smart to do it. I regard this as an important criticism. I think it is easy for us to say more than we are competent to say.

Page 1, 3rd ¶, 2nd line. Delete "simple"--talking down.

Page 1, bottom. Better not to criticize the critics because much of the criticism has been thought through and it is the reports of the process plus the special outcomes that agree with the reports that makes the criticisms stick. Why don't we just stick to telling how to do a good draw.

Suggest rephrase first sentence of paragraph. Delete 1st sentence or combine first half with second sentence.

Pages 2-3. It is a weakness that we depend so much on independence. We should have some protection against that.

Page 5, ¶ numbered 1. There is advantage also in the objects offering no impediment to stirring, as for example, cubes might, or objects which come apart. (I do not know what stirs easily, but I suppose ellipsoids rather than spheres. What do physicists say?)

Page 5. In the movies I have seen in news reels great wire cages in the form of cylinders which turn on their axes and move the tickets for a lottery around continuously, presumably for days and maybe weeks. How effective I do not know, but they move through a lengthy system at the same time they are whirling.

Page 5, ¶ numbered 4. Important that the test be made from several angles. For example, if left half of bowl had black and right hand white thorough stirring would tell how well that mixed, but it wouldn't be compelling about top-bottom mixing. We need to be able to stir in 3 dimensions.

Page 6, top. Make clear that each correspondence is itself an attempt at a random matching.

Page 8. Now to something I doubt you want to bring up. What if, when this is finished, there is a muck-up.

Suppose birth dates and numbers correlate highly.

You need to treat three things:

- a) That every set of numbers will have some peculiar patterns;
- b) Some remarks about deliberate fraud. For example, is it a crime to tamper with the draft lottery?
- c) What about an outrageous thorough honest result?

My point in (b) is that in spite of all our statistical hocus-pocus, we are not directly protected against dedicated magicians and some police surveillance at least should be required. And we should note this as a practical problem. We are emphasizing that we can do it, but we can be taken if we are too innocent.

Now to Watson's material which he was kind enough to send. Implicitly, he raises the question whether we can be responsible for randomizing the whole lottery and thus make everything fair.

This bears on the memo in several important ways.

1. It is important to disclaim anything about problems related to deferments, or more generally lists of eligibility, and to explain that this issue is not one we can attend to.

2. The bias owing to the subgrouping under what Watson calls "Present Method" is going to be substantial as compared with the sorts of promises being made on the basis of super-randomization and stirring. This needs to be brought out.

Professor John W. Tukey

- 3 -

March 3, 1970

Therefore, we should not have remarks about the law and "de minimis" since the biases in the larger system do not partake of the smallnesses being advertised in the rest of the document.

I do not find it necessary to go as far as Geof implicitly suggests. I am willing to regard the original designation of eligibles as separable from the randomization issue.

Best regards,

Fred
Frederick Mosteller *fg*

Dictated but not read by.

FM/hlg

cc: William G. Cochran
Morris H. Hansen
Frederick F. Stephan
G. S. Watson

