

Statisticians Charge Draft Lottery Was Not Random

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WASHINGTON, Jan. 3—The new draft lottery is being challenged by statisticians and politicians on the ground that the selection process did not produce a truly random result.

The challenge was taken up by the courts this week when a Federal district judge in Wisconsin, James Doyle, agreed to hear a test case on the lottery.

"It may become necessary," the judge warned, "to accept the consequences." By that he meant a new drawing.

The attacks on the system of selection come at a time when hundreds of thousands of young men have been assigned a spot in the draft sequence and when the first men are about to be inducted under the new lottery.

They threaten to undermine public confidence in the draft and provide an issue for Congressional hearings on the draft scheduled to begin early this year.

New Drawing Ruled Out

A knowledgeable White House official said this week that "discussions that the lottery was not random are purely speculative." He added that there was "no possibility" that there would be another drawing.

The Selective Service official who conducted the lottery Dec. 1 said, "An effort was made to make the thing as fair as possible."

But there are experts in the laws of probability who say that there are enormous odds against a random selection process producing the result of last month's lottery, in which dates late in the year tended to be drawn early and vice versa.

"It appears necessary to determine whether perfect randomness was approached as reasonably as possible under all the circumstances," Judge Doyle said.

Senator Edward M. Kennedy, one of the leading Congressional critics of the draft, asked the National Academy of Sciences last month to analyze the "apparent lack of randomness" in the selection. The academy has not decided whether to honor the Massachusetts Democrat's request.

In an Executive order signed Nov. 26, President Nixon ordered the Selective Service system to "establish a random selection sequence" for induction. The Executive order stipulated that the lottery would be based on birthdays but provided no instructions to draft officials on the method of drawing the dates.

The officials decided on the method of drawing after a staff meeting. They placed the 366 dates of the year in capsules that were drawn, one by one, from a large bowl.

(There were 366 numbers drawn because men born in 1944 and 1948 were affected by the lottery, and those years were leap years. In subsequent lotteries, when only 19-year-olds will be affected, 365 numbers will be drawn if the birth year of the men involved in the lottery was not a leap year.)

A man's draft number corresponds with the order in which his birthday was picked. For instance, Sept. 14 was the first date drawn and men with that birthday were assigned No. 1. June 8 was the last date picked, and men born then were given No. 366.

Thus the lower a man's draft number, the greater the likelihood that he would be drafted. Pentagon manpower specialists believe that men with numbers in the highest third—from the mid 200's through 366—will escape the draft entirely.

The challenges to the random selection process are based on calculations of average numbers for the men in the lottery for each month.

January Average Is 201

For instance, the average number for men born in January is 201, while the average number for December is 122. These averages are obtained by adding all the lottery numbers of the dates in the month and dividing by the number of days in the month.

The average numbers for other months are: February, 203; March, 226; April, 204; May, 208; June, 196; July, 180; August, 173; September, 157; October, 182, and November, 149.

If the system were random, each month could be expected to have an average around 183 or 184. Each of the first six months has an average number above this. Each of the last six months has an average number below it.

The general decline in the average monthly numbers can be seen if a graph is constructed, with the months from January through December along the horizontal axis and the average numbers plotted vertically. The points reach a high in March and then fall in an almost linear progression through December.

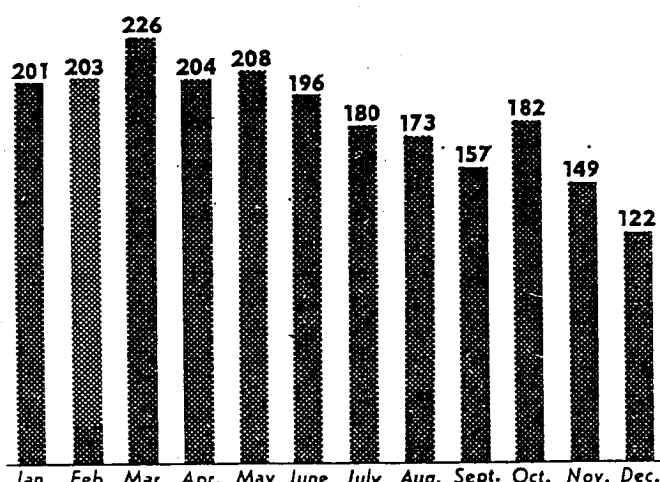
The pattern of the result could have been expected, according to statisticians who have studied the lottery, if somehow the capsules containing dates in the early months were at the bottom of the bowl and those containing dates of the late months were on top.

The fact that the linear decline does not hold true for the first five months of the year could be explained, they say, because, as draft officials acknowledge, the capsules with the later months were not mixed as thoroughly as those of the earlier months.

According to Fred T. Hadlock, professor of astronomy at

MONTHLY LOTTERY NUMBERS

Average lottery number for men born in each month



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Averages were obtained by adding up total of lottery numbers for month and dividing by number of days in the month. A random system could be expected to produce an average number of 183 or 184 in every month. The lower the number, the better the chances of being drafted.

lection process is 100,000 to 1, and February capsules were thoroughly mixed.

Two graduate students at the University of Wisconsin, David Stodolsky and Carol Falender, believe the probability is 50,000 to 1.

Statisticians at other universities have arrived at similar results.

Statisticians usually work on the principle that a random test should produce results that occur at least once in 20 times under the laws of probability. If the results occur less frequently, then the statisticians conclude that some causative factor was involved.

In a letter they sent to members of Congress from Wisconsin, Mr. Stodolsky and Miss Falender wrote:

"One might comment that the results are due to chance. But what would you think if you were given a coin to flip, and it landed on edge both the first and second time, and then rolled away, falling through a crack in the floor so you couldn't flip it again?"

It was Mr. Stodolsky, a 24-year-old doctorate student in computer planning, who filed the suit in Federal District Court in Madison, Wis., seeking to void the lottery and force a new drawing.

His lawyers argue that the Executive order called for a random drawing and that the actual drawing was not random.

Judge Doyle denied Mr. Stodolsky's request for an injunction to prevent the Government from drafting men until the case was decided. He said there was not enough evidence to warrant the injunction.

John E. Olson, the assistant United States attorney in Madison who is defending the Government in the suit, said he had not prepared his case and did not know when the suit would go to trial.

It appeared likely that whatever the outcome the decision would be appealed to a higher court.

Mr. Olson said that on the basis of his early investigations, "we have found absolutely nothing that indicates that there is a bias, intentional or otherwise."

Types of Random Methods

Prof. John H. Smith, the chairman of the statistics department at the American University here, said he could not discuss whether the lottery were truly random without conducting his own tests. But he added:

"When you conduct a drawing like this, there are two ways to go about it. You can be certain of being random by picking a table of random numbers. These can be found in just about any statistics text book or can be obtained by a number of mechanical means, such as by throwing dice or using a computer.

"Or you can have a show and use a fishbowl. When you use the fishbowl method, you run the chance that the bowl might break or the capsules might split or they might not be stirred up or whatever."

Navy Capt. William S. Pascoe, chief of public information for the Selective Service System, was assigned the task of conducting the lottery. He gave the following description of the actual procedure:

Over the weekend before the Dec. 1 drawing, Captain Pascoe and Col. Charles R. Fox, under the watch of John H. Adams, an editor of U.S. News & World Report, set up the lottery.

They started out with 366 cylindrical capsules, one and a half inches long and one inch in diameter. The caps at the ends were round.

The men counted out 31 capsules and inserted in them slips of paper with the January dates. The January capsules were then placed in a large, square wooden box and pushed to one side with a cardboard divider, leaving part of the box empty.

The 29 February capsules were then poured into the empty portion of the box, counted again, and then scraped with the divider into the January capsules. Thus, according to Captain Pascoe, the January the University of Michigan, the probability of such a pattern occurring by a truly random se-

sules 11 times, the February capsules 10 times and so on, with the November capsules intermingled with others only twice and the December ones only once.

The box was then shut, and Colonel Fox shook it several times. He then carried it up three flights of stairs, a process that Captain Pascoe says further mixed the capsules.

The box was carried down the three flights shortly before the drawing began. In public view, the capsules were poured from the black box into the two-foot-deep bowl.

Captain Pascoe said he did not know which end of the box he poured from. If he poured from the end where the capsules with the early months had been repeatedly shoved, these capsules might have fallen to the bottom of the bowl. Conversely, if he poured from the other end, the later months could have fallen to the bottom. This assumes that the shoving and shaking procedure did not adequately mix the capsules.

Once in the bowl, the capsules were not stirred. The last draft lottery, in 1940, was conducted entirely differently. But officials remembered that when the capsules were stirred then, some of them broke.

The persons who drew the capsules last month generally picked ones from the top, although once in a while they would reach their hand to the middle or the bottom of the bowl.