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## STATISTICAL EVIDENCE IN JURY DISCRIMINATION CASES

JOHN S. DE CANI\*

### THE BACKGROUND

In a series of decisions beginning in 1880 with *Strauder v. West Virginia*,<sup>1</sup> the United States Supreme Court has gradually refined the definition of what constitutes jury discrimination. Justice Douglas, in his concurring opinion in *Alexander v. Louisiana*,<sup>2</sup> wrote that the accused has a "constitutional right to an impartial jury drawn from a group representative of a cross-section of the community."<sup>3</sup> This seems to be the operant definition of due process as it applies to the selection of juries today.

In order to show that he has been denied due process because of jury discrimination, a petitioner must show two things: first, that his jury was not "drawn from a group representative of a cross-section of the community," and second, that "the opportunity for discrimination was present."<sup>4</sup> In fact, the definition of "representative cross-section" seems to depend on the class of the petitioner. *Alexander v. Louisiana*<sup>5</sup> is instructive. Claude Alexander, a Negro, appealed his conviction for rape on three grounds:

(1) He was indicted by a grand jury chosen from a venire from which Negro citizens were systematically excluded.

(2) He was indicted by a grand jury chosen from a venire from which women were systematically excluded.

(3) A statement was introduced at his trial which he had allegedly given to the police shortly after his arrest, at a time when he had neither waived his right to remain silent, nor his right to have counsel present at the time he gave the statement.<sup>6</sup>

In its opinion, the Court ignored the third ground and reversed the decision of the lower court

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<sup>1</sup> 100 U.S. 303 (1880).

<sup>2</sup> 405 U.S. 625, 634 (1971) (Douglas, J., concurring).

<sup>3</sup> *Id.* at 635.

<sup>4</sup> See *Whitus v. Georgia*, 385 U.S. 545 (1967).

<sup>5</sup> 405 U.S. 625.

<sup>6</sup> Brief for Petitioner at 2-3, *Alexander v. Louisiana*, 405 U.S. 625 (1971).

on the basis of the first. With respect to the second point, the Court said:

This claim is novel in this Court and, when urged by a male, finds no support in our past cases. . . . [T]here is nothing in past adjudications suggesting that petitioner himself has been denied equal protection by the alleged exclusion of women from grand jury service. . . . Against this background and because petitioner's conviction has been set aside on other grounds, we follow our usual custom of avoiding decision of constitutional issues unnecessary to the decision of the case before us.<sup>7</sup>

This seems to mean that a defendant has cause to complain only if the group from which his jury was chosen was unrepresentative with respect to his own class. Once the petitioner has shown that the group from which his jury was chosen was not representative of his class, and that the opportunity for discrimination was present, he is said to have made a "prima facie case." Such a case having been made, the burden shifts to the state to rebut it.<sup>8</sup> The statistician's task is to assist in making the prima facie case. A statistician might also be called upon to rebut such a case, but, as far as I know, this has not yet happened.

It is only recently that the Court has begun to accept sophisticated statistical arguments based on probability theory in these cases. The first such case was *Whitus v. Georgia*,<sup>9</sup> but note the judicial caution. The relevant footnote begins, "While unnecessary to our disposition of the instant case, it is interesting to note the 'probability' involved in the situation before the Court."<sup>10</sup> Four years later, the caution was still present, reflected in a footnote in *Alexander*: "We take note, as we did in *Whitus v. Georgia* . . . of petitioner's demonstration. . . ." <sup>11</sup> Here, the word "probability" is no longer enclosed in quotes, and the word "chances" is used, again without quotes, as a synonym for probability. The

<sup>7</sup> 405 U.S. at 633.

<sup>8</sup> See *Turner v. Fouche*, 396 U.S. 346, 361 (1970). See also *Norris v. Alabama*, 294 U.S. 587, 591 (1935).

<sup>9</sup> 385 U.S. 545 (1967).

<sup>10</sup> *Id.* at 552 n.2.

<sup>11</sup> 405 U.S. at 630 n.9.

Fifth Circuit Court of Appeals was more explicit. In *Salary v. Wilson*,<sup>12</sup> in a closing footnote, the court said: "Such probability calculations are admissible in a jury discrimination case if proffered by a qualified witness with underlying data properly proved."<sup>13</sup>

Apparently, the Court was persuaded to accept probabilistic arguments by a paper by Michael Finkelstein which appeared in the *Harvard Law Review* in 1966.<sup>14</sup> In this paper, Finkelstein traces the history of judicial reasoning in discrimination cases, and shows that the Court has been intuitively reasoning probabilistically for some time. He argues that statistical decisions have a well established theoretical basis which should replace intuition in judicial reasoning. He illustrates his point by applying statistical reasoning to the facts in several jury discrimination cases. The Court cited Finkelstein in its *Whitus* decision,<sup>15</sup> and this paper has had a major influence on legal arguments in jury discrimination cases ever since.

#### DISCOVERING THE FACTS

In order to make a *prima facie* case that he has been denied due process, the plaintiff must first show that his jury was not drawn from a group representative of a cross-section of the community, and then show that the opportunity for discrimination was present. The latter demonstration has usually been based on the source of the jury list, such as tax rolls, voter registration lists, city directories or telephone directories. One could argue statistically that these sources are themselves nonrepresentative, but the more common argument is that the sources supply some racial designation. That this is so is an ascertainable fact, and does not require a probabilistic argument.

Since the decision in *Whitus*, the Supreme Court has shown a willingness to listen to a probabilistic argument that the group from which the jury was chosen was not a representative cross-section of the community. In order to understand the argument, one must have a rough idea of how juries are selected. Practice varies from place to place, as does the terminology, but what follows is typical of many jurisdictions.

The boundaries of the geographical area from

<sup>12</sup> 415 F.2d 467 (5th Cir. 1969).

<sup>13</sup> *Id.* at 473 n.11.

<sup>14</sup> Finkelstein, *The Application of Statistical Decision Theory to the Jury Discrimination Cases*, 80 HARV. L. REV. 338 (1966).

<sup>15</sup> 385 U.S. at 552 n.2.

which jurors are drawn depends upon the jurisdiction of the court. Frequently, this jurisdiction encompasses a county. The qualifications for jury service are set by statute. Until recently, for example, a juror had to be twenty-one years of age or older, and of "good character." In some areas, women may serve only if they volunteer. Convicted felons, and persons under indictment for a felony, may not serve. In each jurisdiction, a Jury Commission is appointed whose task it is to prepare a list of persons eligible for jury service for each term of court, and to keep that list up to date. This list is called the "jury roll." When a jury is required, a list of names is selected from the jury roll, and the persons on the list are notified to appear in court on a given day for possible jury service. The list of persons called to appear is called a "venire." The actual jury is chosen from the venire.

Justice Douglas, in his opinion in *Alexander*, indicates that the jury must be chosen from a group representative of a cross-section of the community. He does not say that the jury itself must be representative. The plaintiff cannot attack his own jury as being nonrepresentative of his class. He can, however, show that his class has been persistently excluded or under-represented on juries in the past.<sup>16</sup> Ordinarily, the plaintiff tries to show that the jury roll is nonrepresentative. He may also show that the venire from which his jury was chosen, and a sequence of venires preceding his own, were nonrepresentative.

In order to show that a jury roll is not a representative cross-section of the community, there must be available a description of the community. "Community" here means the population of the jurisdiction eligible for jury service. Ideally, one will have a statistical description of this population as of some time immediately preceding the plaintiff's trial, perhaps, as of the beginning of that particular term of court, or as of the time of the crime. This description should give the total number of persons eligible and the number of eligibles in the plaintiff's class. Obviously, such a description is seldom available.

The Court has accepted other statistical descriptions of the community, most frequently the most recent census of population for the jurisdiction. The census, taken every ten years, is subject to error, and is obsolete within three or four years. Yet, it is a publication of the Government, which seems to give it a certain credibility in the eyes of

<sup>16</sup> See, e.g., *Norris v. Alabama*, 294 U.S. 587 (1935).

the Court. To the statistician, the census has advantages because it classifies the population as to age, race and sex. Sometimes, equally acceptable and more recent descriptions are available. In *Salary*, there was available a census taken by the Birmingham, Alabama Health Department in 1967, which classified residents of Bessemer by age, race and sex. These data were acceptable to the court. In many jurisdictions, the voter registration list provides an acceptable listing of the eligible population. Once such a list is in hand, however, the race and sex of the persons on it must be ascertained. The voting age is usually coincident with the age for jury service. For most persons on the list, sex may be judged by the name and, frequently, race may be judged by address. A complete breakdown of the voter registration list requires some field work, and most plaintiffs do not have the necessary resources available. Furthermore, the court must be willing to accept the reliability of the procedures used.

In cases where voter registration lists have been used, the necessary field work has been done by volunteers. Where possible, race and sex have been determined by name and address. In small rural counties, many persons on the voter registration list are known to the volunteers. Cases of doubt must be resolved by face-to-face interviews. Even here, complete classification of the voter registration list is time consuming and subject to some errors. In large jurisdictions, such a task is impossible. Yet, with new and more stringent voter registration laws, the voter registration list comes closest to being the most recent and most nearly complete listing of the group of eligible jurors. With modern sampling techniques, it is possible to obtain very reliable estimates of the characteristics of persons on these lists using relatively small samples. The sampling could easily be supervised by a professional and carried out by a small group of trained volunteers. That this is seldom done seems to be because courts and attorneys have more faith in bad censuses than in good samples.

As a last resort, one can always fall back on the United States Census for a description of the community that is acceptable to the Court. There is no such "out" for obtaining a description of the characteristics of the jury roll. In some cases, as in *Alexander*, the questionnaires sent to prospective jurors contain questions pertaining to age, race and sex. In others, the original source of the jury roll, such as the tax roll or the city directory contains the necessary information. Frequently, the only

way to obtain the information is through local informants or face-to-face interviews. As with the voter registration list, reliable estimates of the characteristics of the jury roll can be obtained using modern sampling techniques. Sampling has been used in some cases, but it has been of a very simple nature. Thus, a 20 per cent sample of the jury roll might be taken by choosing one of the first five names on the list "at random," and every fifth name thereafter. Courts have accepted such procedures, probably without realizing that their technical analysis can be very complicated. The effect of selecting every fifth name on a list is not the same as selecting 20 per cent of the names at random.

Relying on local informants can sometimes lead to difficulty. After the Court rejected petitioner's claim of jury discrimination in *Swain v. Alabama*,<sup>17</sup> Swain's attorneys sought to reopen the case using a more sophisticated statistical argument. The 1960 U.S. Census of Talladega County, Alabama provided a description of the characteristics of the community, and a comparison was made between the racial characteristics of the community, as shown by the Census, and the racial characteristics of a sequence of veniremen, including the one from which Swain's original jury was chosen. Local volunteers were used to determine the race of the veniremen, and, in some cases, race was ascertained by inquires in the neighborhood. At the hearing, the county prosecutor objected to the statistical evidence on the grounds that it was hearsay. His objection was sustained and the statistical argument was not heard. *Swain* was my first case, and I found it frustrating not to be able to testify once I had taken the stand. More important, however, is that we learned something about what constitutes acceptable statistical evidence. The underlying data must be "properly proved." Witnesses must be able to testify from first-hand knowledge when data do not come from a source such as public records, which courts will accept. This is a strong argument for sampling when the plaintiff must obtain the data himself.

#### MAKING THE DEMONSTRATION

Given that there exists data, properly provable, on the characteristics of the community and the characteristics of the group from which the plaintiff's jury was chosen, one must next consider the question of whether the group is a "representative

<sup>17</sup> 380 U.S. 202 (1965).

cross-section" of the community. Immediately, one is confronted by a minor difficulty. A jury roll would be nonrepresentative if the plaintiff's class were either substantially under-represented or substantially over-represented on it. Yet, it is doubtful that any court would support a claim that the plaintiff had been denied due process because his class was substantially over-represented on the jury roll. What must be shown, in fact, is that the plaintiff's class was substantially under-represented.

In statistical parlance, one is concerned with a "one tail" test. The logic of such a test is best explained by a hypothetical example. Suppose that the "community" contained 50 per cent black and 50 per cent white members, and the jury roll contained 100 names. For simplicity, assume that the community is "very large", so that drawing any 100 persons from it will not substantially alter its racial composition. Under the law, the method of selecting names for the roll must be independent of race. If this is so, then blacks and whites have the same probability of selection, and one would expect about one-half the names to be those of black persons. While the most probable composition of the jury roll is fifty-fifty, one would not suspect the selection procedure if it produced the names of forty-five blacks and fifty-five whites. One becomes suspicious only when the result seems "very unlikely" to have been produced by a selection procedure that is racially blind. Probability theory provides an objective measure of how suspicious one ought to be. Without additional assumptions, which would be difficult to defend, one cannot compute the likelihood, or probability, given the result, that an unbiased selection procedure was used. One can, however, compute the probability of obtaining any result, given that the selection procedure was unbiased. (Note that these two probabilities are different. The probability that a card is an ace given that it is a heart is quite different from the probability that it is a heart given that it is an ace.)

Suppose the roll contains the names of thirty-eight blacks and sixty-two whites. If one suspects the selection procedure when thirty-eight blacks appear on the roll, then he ought to suspect it even more if fewer than thirty-eight blacks appear on the roll. If the method of selection is independent of race, the probability of obtaining the names of thirty-eight or fewer blacks on a roll of 100 names is approximately 0.01, *i.e.*, the chances are about one out of 100. If one regards one chance in a

hundred as extremely unlikely, then there is reason to be suspicious of the selection procedure. In most routine statistical work, one chance in twenty (0.05) is regarded as small enough to warrant the judgement that factors other than chance were operating to produce an observed difference.

Most statisticians would urge courts to decide in advance of seeing the evidence how small the probability must be in order to make a *prima facie* case. Most courts would probably regard such advice as heresy. Yet, courts draw lines all the time, and drawing this line would remove one element of arbitrariness from the decision. In doing so, however, courts should be aware of the hazards involved. Suppose the court draws the line at one chance in one hundred, maintaining that a probability of 0.01 or less makes a *prima facie* case of jury discrimination. In the hypothetical example, if thirty-eight or fewer blacks appear on the jury roll, a *prima facie* case has been made, and the burden shifts to the state to explain the discrepancy. If the selection procedure is, in fact, unbiased, there is a 1 per cent chance that it will produce a jury roll which makes a *prima facie* case against it. The court faces a 1 per cent risk of falsely concluding that the selection procedure is biased. On the other hand, a biased selection procedure could be used so long as the names of more than thirty-eight blacks appear on the roll. If, for example, as names are drawn for the jury roll, every fifth black name is discarded, then blacks have only four chances out of nine of being on the jury roll. The procedure is clearly discriminatory; yet, there is about an 88 per cent chance that more than thirty-eight black names will appear on the roll, and the discrimination will go undetected. If the discrimination persisted over several jury rolls, however, it would almost certainly be detected. In drawing the line, the court is deciding two things. It is deciding how much discrimination it will tolerate, and it is deciding the risk a fair selection procedure runs of being falsely condemned. Drawing the line in advance quantifies the meaning of "beyond a reasonable doubt."

If the line is drawn, it should be drawn in terms of a probability rather than in terms of some percentage point discrepancy. I have suggested that most people would not suspect foul play in a 45-55 split on a jury roll of 100 names drawn from a community consisting of 50 per cent blacks. This is a five percentage point discrepancy. If the method of selection is unbiased, then on a jury roll of 100 names, the probability of a discrepancy of five or

more percentage points in favor of whites is about 0.18. On a jury roll of 10,000 names, however, the probability of such a discrepancy is less than one in a billion billion, *i.e.*, a decimal point followed by 18 zeroes and a one. This is about the same as the probability of tossing 60 or more consecutive heads with a fair coin.

The probabilities I have encountered in jury discrimination cases have been astonishingly small. In most of our work, statisticians deal with probabilities of the order of 0.01 or 0.001. A probability of 0.0001 is unusual. Yet, in *Swain*, the first case in which I prepared testimony, I obtained a probability which, if written out in full, would be written as a decimal point followed by 195 zeroes and a 4. How does one comprehend such a probability? The only way, it seems to me, is by comparison with other rare events with which the court is familiar. In five card draw poker—with no wild cards—the probability of a royal flush is one chance in 649,750. In decimal form this is written as 0.000001539. The probability of two or more consecutive royal flushes is the square of this number, or about 0.000000000002. If we could deal one poker hand a second, we would have to wait, on the average, more than 13,000 years before we saw two or more royal flushes back-to-back. Two or more consecutive royal flushes is an extremely rare event. The probability I obtained in *Swain* is less than the probability of 30 or more consecutive royal flushes. The smallest such probability I have obtained occurred in *Salary*. It was less than the chances of being dealt 500 or more consecutive royal flushes, a real statistical treasure.

While the court didn't hear my analogy in *Swain*, I've had fun with it elsewhere. In one case, the judge in a recess asked about the probability of filling an inside straight, and, in another, the judge declared that he would "start shooting" on

the third consecutive royal flush. (He then asked that his remark be struck from the record.)

Other kinds of statistical arguments have been suggested in order to buttress the claim of jury discrimination. Finkelstein refers to *State v. Barksdale*,<sup>18</sup> in which on nine consecutive grand juries, eight contained two blacks and one contained one black. This uniformity is striking and could be evidence of a policy of limiting the number of blacks on any grand jury to two. The probability of this happening by chance is 0.0014. In one case, I was asked to compute the probability that on a venire of 50 persons drawn at random from the jury roll, the first 21 names on the list—in order of their being drawn—would be those of white persons when the jury roll contained 80 per cent white names. This probability is about 0.0018. Both of these events are unlikely, but it is up to the court to decide whether an event having a probability of slightly less than one in five hundred is rare enough to justify the conclusion that it could not have occurred by chance. Such arguments are peripheral to the main argument, however. The result of the selection process must be discriminatory. Otherwise, the plaintiff cannot make a *prima facie* case.

I am not optimistic or naive enough to believe that statistics will save the world from jury discrimination. As statistical arguments become accepted in the courts, discrimination will become less blatant. Probabilities like the ones in *Swain* or *Salary* will not occur. Discrimination will become more subtle. If courts are willing to draw the line at probabilities of 0.01 or 0.001, the limits of discrimination will be defined. If discriminatory practices persist, statistics will eventually flush them out.

<sup>18</sup> 247 La. 198, 170 So. 2d 374 (1964), *cert. denied*, 382 U.S. 921 (1965).