JURY SELECTION AS A BIASED SOCIAL PROCESS*

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Models of the jury selection process in a Federal District Court are developed from court records, legal standards, and other information and then compared to determine sources of bias. The jury selection plan developed by the court has been operationally reformulated using 1970 census data to identify bias resulting from even a fair application of the plan. This normative model is also used to test for biases in the procedures and the results of the 1970 plan implementation in Eastern Massachusetts based on voter registration lists. Findings support the hypothesis that the juror selection process effectively discriminates against the poor, the young, racial minorities, women, and persons with low and high educational attainment. Sources of bias are found in the use of outdated voter registration lists, unreturned jury qualification questionnaires, and the excuse process. Recommendations are given for ways to reduce the extent of this bias.

I. INTRODUCTION AND OVERVIEW

This paper presents a new approach to the study of juror selection, combined with findings from an ongoing study of possible biases in the jury selection process in the Eastern Division of the United States District Court, District of Massachusetts. Previous research on this subject has focused on simple comparisons between the composition of jury pools and the general population (e.g., Kairys, 1972). Resulting disparities are then attributed to aspects of the process based on an intuitive notion of the possibilities for bias. This study attempts to model and examine empirically each stage of the process in order to isolate those stages that account for whatever bias may be found. The constitutional standard, that qualified juror lists (wheels or pools from which panels or venires are selected)[1] provide "a fair cross section of the community" (Jury Selection and Service Act of 1968, 28 U.S.C. §§ 1861-69), is used to define the normative ideal of

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1. The jury wheel or pool contains the names of all prospective jurors who are found to be qualified and nonexempt from jury service. A panel or venire is a group of jurors selected from this pool who are called for service in a particular section of the court.

an "unbiased" (or "fair") selection process.[2] This norm is statistically compared with recent practices implementing the 1970 Plan for Random Selection of Jurors (U.S. District Court, 1970) (hereafter called the Plan). The sources of the selection process (voter registration lists), its actual procedures, its normative basis (the Plan) and its outputs (the qualified juror lists or venires) are all investigated.

The major hypothesis, heavily supported by these analyses, is a "Middle American" bias, the overrepresentation of "Middle Americans" on qualified jury wheels and derivative venires. Stated negatively, we have found that blacks, women, urbanites, the young and the elderly, the poorly and the highly educated, all have less than a fair chance of making venire lists. Various subgroups, like young blacks, were even more sharply underrepresented. These findings, and others, are based on a comparison of venire-list data on 1150 qualified jurors with target proportions estimated from a census-based, normative juror selection model formed to satisfy much of the language of the court's 1970 Plan, but designed to approximate better its constitutional objectives.

An empirical analysis of various stages of the juror selection process has been made to examine the causes of these biases. Both the excuse process (which differentially removes women and the highly educated) and total reliance on voter registration lists (which are biased against blacks and the young) were found to be responsible. Research along these lines is continuing, as is inquiry into feasible remedial practices, such as census-based oversampling of registration lists or police lists from communities or precincts known to contain high numbers of underrepresented social groups.

Because the analysis is focused on qualified jurors selected from the 1968 Presidential election voter registration lists and matched with 1970 census data, the above findings obviously generalize to subsequent years in the 1969-1972 period. Both grand and petit juries derive from the same qualified lists. Our procedures and findings may well apply, with appropriate modifica-

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2. The concept of a "fair cross section" of the community seems to mean that no cognizable class is discriminated against, and has been held to be required by both the Constitution and the basic concepts of a democratic society (Smith v. Texas, 311 U.S. 128, 1940; Thiel v. Southern Pacific Co., 328 U.S. 217, 1946). This standard has been held to apply to state as well as federal courts through provisions of the Fourteenth Amendment (Fay v. New York, 332 U.S. 261, 1947; Swain v. Alabama, 380 U.S. 398, 1965). While the Court has established this standard, it has failed to establish precise principles for ascertaining deviations from a fair cross section.

tions, to other time periods, and other court districts within the United States.

II. BUILDING A TESTABLE NORMATIVE MODEL
OF JUROR SELECTION

Claims that a particular selection process is "biased" or "unfair," such as those already summarized above, depend for their validity on the acceptability of both their normative basis and their descriptive content. Our argument for such claims will therefore require adequate data on the actual selection process, and the construction of an acceptable, operationally comparable normative basis for our investigations. This basis, stated in formal language, will be nothing more than a simulation model of an idealized juror selection process. Derived largely from the judicially approved Plan,[3] it has been designed to realize its constitutional objectives more fully through the use of a broader initial population in the selection process.

The formal abstraction of a normatively oriented simulation model has several important advantages that we feel compensate for the difficulties in translation and comprehension it introduces. First of all, the model is completely specified in elementary unambiguous mathematical language, and hence easily and explicitly challengeable. Second, by using different initial data inputs or procedural parameters the model can simulate different hypothetical realities, both to explore the implications of alternative normative practices (e.g., changing initial population lists or allowable excuse practices) and to deduce the consequences of such alternatives in cross-sectional terms. Third, process simulation seeks to achieve correspondences with particular stages of real (but possibly biased) and realizable (and hopefully fairer) social processes. It thus facilitates ideal-realizable-real comparisons.[4]

A. The 1970 Plan For Random Selection of Jurors

A brief description of the currently accepted juror selection plan as it applies to the Eastern Division of Massachusetts is a

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3. The xeroxed, undated copy of this plan made available to us by the Clerk of the United States District Court, District of Massachusetts, is described "as modified, March 1970" and "with modifications of Oct. 9, 1970 as suggested by Aldrich, C.J." Unidentified quotations in our description of this plan come from this document. This plan, based on the use of registration lists, has been in effect since 1968.

4. The literature on simulation modeling is vast, but has not yet been fruitfully utilized in social scientific studies of legal processes. The technically interested reader might find helpful the relevant introductory chapters in Lindzey and Aronson (1968) and Greenstein and Polsby (1975). A short, relatively nontechnical treatment in a legal area by one of the present authors is Alker (1972).

necessary preliminary. To facilitate comparisons with our ideal-ized, census-based, formal alternative (the model summarized in Figure 2) and data on the actual selection process (presented in section III and Figure 3), the reader is asked to refer to the schematized Plan in Figure 1.

This figure clearly reveals the basic conception of social se-lection processes that we use in our analysis: an initially rel-evant population (symbolically inside the top box) is sequentially augmented or winnowed down by the application of selection procedures based on normative concepts. Finally, only the most relevant population remains (in the bottom box of the figure). The separation of important steps in this process (roughly, branches indicating population transformation rules, correspond-ing to the vertical arrows between boxes) helps to identify cru-cial points in the social process at which discretionary choices may be made. Where actual procedures depart from relevant normative principles, or stated goals are violated, the population transformation responsible for this can be isolated and investi-gated more particularly through tabular analyses. Juror selec-tion is a particular instance of such a social selection process, wherein procedural rules gradually redefine an "included social group," more or less in accordance with a set of guiding norma-tive principles.

The normative process specified by the Plan consists of seven, partly serialized steps. Except for the Roman numerals in Figure 1, the labels and numbering in this section of our paper and in the texts of that Figure correspond to those of the Plan.

1. **Applicability.** Pursuant to 28 U.S.C. § 1869(e), the East-ern Division of the District of Massachusetts is defined to include "the cities and towns in Worcester County and the counties to the East thereof."

2. **Management and Supervision of Jury Selection Process.** Under judicial supervision, the Clerk of Court is responsible for managing this process; he may authorize "a Deputy Clerk to act for him in performing strictly ministerial nondiscretionary functions." These officials are instructed that "the names of all jurors selected for ultimate drawing to . . . [a] grand or petit juror panel shall be chosen at random."

3. **Random Selection from Voting Lists.**

(a) The court having found that "voting lists prepared an-nually by the registrars of voters . . . represent a fair cross sec-tion of the community in this District . . . the names of persons to be considered for service as jurors on or after the effective

FIGURE 1

A SCHEMA OF JURY SELECTION IN THE EASTERN DIVISION
OF MASSACHUSETTS BASED ON THE 1970 RANDOM PLAN*

Elements of Plan	*Process-relevant Populations*	*Process Details*
I	Population of Eastern Division	
Court finding that annual voting lists meet standard of "fair cross section of community" (3(a)); lists re-drawn every 4th year (4(b))		Defendant's "com-munity" defined as the Eastern Division (1)
II	Annual voting lists for the Division: the "starting population"	
Quotient figure de-fined (3(b)); but only estimated (4(b))		Random selection process according to (2), 3(b) and composition of Wheel (4)
III	Master Jury Wheel defined in 4(a); mini-mum size 1,000 (4(b))	
		Random, public se-lection of names (5) by Clerk (2), and mailing of questionnaire
IV	Population receiving Juror Qualification Questionnaire	
		Post office, popula-tion response, en-forcement actions; general clerk man-agement (2)
V	Returned Question-naires	
Clerk fills Wheel (7)		Judicial determi-nation (6), as recorded by Clerk, of qualified, non-exempt, nonex-cused jurors
VI	Qualified Juror Wheel defined in (7) con-taining Plan-based qualified population	
		Random selection of panels (7) by Clerk (2) and summons and ar-ray size adjust-ments
VII	Petit and grand jury panels defined in (7)	

* According to 2(a) all juror names selected for ultimate drawing to jury panels (venires) shall be chosen at random by 2(b). The Clerk manages jury selection process with nondiscretionary Deputy assist-ance under general judicial supervision.

date of this plan shall be selected at random from the voting lists of all the cities and towns" within the Eastern Division.

This population we shall call the "starting population" according to the Plan. It is numbered as Population II in Figure 1 because the community a defendant subjectively recognizes may differ from such a starting population. Because annually updated registration lists were not used for 1970 juror selection, Population II is a hypothetical population. In the alternative normative model outlined in Figure 2, a census-based estimate of the "total population" of the cities and towns of Eastern Massachusetts is the analogous starting point, but is obviously broader. As the plan requires, census samples should be random and proportionate to the size of starting populations.

(b)   "[E]ach city and town shall be represented in proportion to the number of names in the voting lists" in the "random selection of names to be placed in the Master Jury Wheel. . . ." Dividing the number of names needed for such a wheel by "the total number of names in the voting lists gives a quotient figure." "The Clerk shall draw by lot a starting number from one to the quotient figure . . . [and] use the number drawn [the starting number plus integer multiples of the quotient figure] to select the corresponding numbered names from the voting lists." If the starting number "is larger than the number of persons in the voting list, then the Clerk shall select the last name on the voting list. . . ."

4.   **The Master Jury Wheel.**

(a)   This wheel or revolving box has associated with it alphabetically arranged file cards and a numerically ordered file of Juror Selection Questionnaires. The numbers are assigned "to each name as it is selected" according to the routine of paragraph 3 above. A plastic disc "bearing a number corresponding to the number assigned to the name of each selected person" is placed in the revolving box or wheel.

(b)   The number of names needed to provide qualified jurors should go into the Master Jury Wheel, provided at least 1000 names are chosen. Because the numbers chosen "are less than one half of one percent" of voting list totals, "the total number is unnecessary and cumbersome. The Clerk shall empty and refill the Master Wheel every fourth year" on February 1, 1973, 1977, etc. Additional names may be placed in the wheel if judicially ordered.

These provisions contradict the earlier reference to "voting lists prepared annually," because the Master Wheel is normally

updated only every fourth year, and the Plan does not specify how annually updated registration lists should be used for needed refills. The "cumbersome" calculation of the total number of registered voters, if "unnecessary," means that the Clerk must make an educated guess as to its size in order to determine the quotient figure. Nonetheless the minimum of one thousand people for various random samples has been used several times in our analyses below.

5. **Drawing Names from the Master Wheel.** As necessary, "the Clerk shall publically [*sic*] draw names from the Master Wheel, by drawing numbered discs from the revolving box." An alphabetical list of the corresponding names is made up and each person on it sent a Jury Qualification Questionnaire, instructions and a franked return envelope, in accordance with 28 U.S.C. § 1864.

Figure 1 emphasized the empirical importance of processes intervening between the drawing of names (step 5) and the qualification/exemption/excuse process of step 6. Thus, we have defined and labeled intermediate Populations IV and V in that figure.

6. **Qualifications, Exemptions, and Excuses from Jury Service.**
(a) *Qualifications.* Using only the information on the juror qualification form "and other competent evidence" a judge shall determine "whether a person is unqualified for or exempt, or to be excused from jury service," with the Clerk recording this determination on the form and on the corresponding alphabetical list. A person is deemed qualified unless he:

"(1) is not a citizen of the United States twenty-one years old [now eighteen] who has resided for a period of one year within the judicial district;

(2) is unable to read, write and understand the English language with a degree of proficiency sufficient to fill out satisfactorily the juror qualification form;

(3) is unable to speak the English language;

(4) is incapable, by reason of mental or physical infirmity, to render satisfactory jury service; or

(5) has a charge pending against him for the commission of, or has been convicted in a State or Federal court of record of, a crime punishable by imprisonment for more than one year and his civil rights have not been restored by pardon or amnesty."

For any starting population, we shall refer to the "unqualified population" and the "qualified population" as those respec-

tively evidencing or not evidencing the deficiencies listed above, as determined from the annotated juror forms. When, according to our alternative normative model, an approximation of these criteria is applied to a census-based "total population," we refer to the "(potentially) unqualified" or "(potentially) qualified" populations.

(b) *Exemptions.* 28 U.S.C. § 1863(b)(6), exempts the following groups, in the public interest:

"(1) members in active service in the Armed Forces . . . ;

(2) members of . . . fire or police departments . . . ;

(3) public officers in . . . [any of the] branches of the Government of the United States, or any [part thereof] . . . who are actively engaged in the performance of official duties. Public officer shall mean a person who is either elected to public office or who is directly appointed by a person elected to public office."

By analogy to the terminology introduced above, we may define "exempt" and "nonexempt" Plan-based, actual or potential populations.

(c) *Excuses.* 28 U.S.C. § 1863(b)(5) excuses members of certain classes for whom jury service would entail "undue hardships or extreme inconvenience," "upon individual request":

"(1) Persons over 70 . . .;

(2) Ministers of religion of any denomination, and members of religious orders, lay or clerical, actually following their calling as a full-time occupation;

(3) Persons essential to the care of children of tender years or of aged or infirm persons;

(4) Registered physicians, surgeons, dentists, pharmacists, and nurses actually engaged in the practice of such professions;

(5) Persons who have served as a juror in any court within the past two years;

(6) Teachers at a University, College, Academy or other school having a regular schedule of classes;

(7) Attorneys at Law;

(8) Sole proprietors of businesses who can show no available substitute;

(9) Any person who resides more than 80 miles or more than two hours of travel time from the place of holding court, or any person to whom no private or public transportation is available."

Analogously, we define Plan-based, actual, or potential "excusable," "nonexcusable," and "excused" populations.

7. **The Qualified Jury Wheel.**   This consists of two files and a revolving wheel or box, containing file cards, completed questionnaires and corresponding numbered discs "for each person drawn from the Master Jury Wheel and not disqualified, exempt, or excused pursuant to this plan."   Necessary quantities of discs are randomly drawn upon judicial request and the associated persons summoned to court for grand or petit venires.   Names may be kept confidential.   Excess names may be reassigned as the Clerk sees fit.   Leftovers from grand juror arrays may be used for the same purpose, together with temporarily excused persons.   Once again we will speak of Plan-based, actual, and potential Qualified Jury Wheels.

It is important for further discussions of the Plan to review some of its key features, as suggested by Figure 1.   Its "starting population" (the voting list symbolically inside box II) has been explicitly sanctioned.   So have the detailed rules at the heart of the plan, section 6.   Given the frequent appeal to randomizing devices, the only apparently discretionary step remaining is from V to VI, the judicial determination of who satisfies a maze of qualification, exemption, and excuse rules.   Just as our empirical work suggests gathering data on returned mailings (the stages between boxes III and IV of Figure 1), so our normative simulation model of the selection process will analytically distinguish three separate subprocesses within step 6, the V-VI transformation.   Subsequent empirical analyses will also show that a more complex, multistage description of the discretionary parts of the selection process is necessary.

B.   Our Hypotheses

One possible set of reasons for unrepresentative venires might be the failure of the Clerk to implement faithfully the nondiscretionary features of the Plan.   Some problems in this regard were indeed detected, and will be noted below.[5]   But it was felt that such an analysis could not account for the scarcity in actual juries of "nonmiddle" groups like racial minorities, the poor, nonstudent youth, professionals, mothers with young children, etc.[6]   Thus a look at Plan procedures and the starting population was suggested.

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5. The most serious one appears to be the reliance on registration lists that are one, two, three, or four years old.   This clearly discriminates against those in the 21-25 age group, even if they do register to vote. In Eastern Massachusetts this group includes many highly mobile students; according to many popular accounts, they encounter many obstacles should they seek to register.

6. Charles E. Wyzanski, Jr., Senior District Judge of the District of Massachusetts, has criticized federal jury pools (panels or venires)

A careful reading of the 1970 Plan suggests at least two plausible reasons for such biases, even were it followed to the letter: its exclusive reliance on the voter registration list to provide an adequate cross section of the population is unjustified in light of the voluminous political science literature;[7] and it is likely that mothers with children, nurses, teachers or higher class professionals would take disproportionate advantage of the excuses in the Plan.

C.   Data Bases

To test these hypotheses, we have developed and operationalized a formally stated normative simulation model of the selection process, the results of which can be compared with data on jurors in the actual venire. This required access to several data bases. In connection with *Berard v. Hogan* (Civil No. 72-2706-6, D. Mass.) we obtained access, on a confidential basis,[8] to reasonably complete sets of Juror Qualification Questionnaires for 1970, 1971, and 1972,[9] selected from November 1968 registration lists more or less according to the rather similar Plans in effect during the 1968-1972 period.[10]

A rich source of data on the Massachusetts public is the 1970 census. Thus it was chosen as the basis for this report, and deemed representative (except for specific year-related effects) of the period November 1968-November 1972.

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as being "middle in income, middle in age and perhaps middle in intelligence" (*Boston Globe*, Dec. 15, 1972, p. 48), and as "visibly under-represent[ing] the young, the black, and the minorities" (*Boston Globe*, Jan. 28, 1973, p. 42).

7.   Kelley *et al.* (1967), in a study of 109 cities including Boston and Cambridge, show age, race, competitiveness, and registration procedures have significant discriminating cross-city effects. See also the summary of voter participation data in Lane (1959: Chaps. 20, 21 and 22, esp. pp. 304, 317). Kelley *et al.* (1967) argue effectively that widely discussed differentials in turnout are partly rooted in unequal or difficult registration practices. Our research has not focused on whether differences in registration rates are the result of willful or unlawful discrimination; it has only asked what differences, if any, can be found.

8.   Data for the present study were obtained through a court order made in this case, which involved a request for a new trial on the basis of jury discrimination. The case was dismissed on the grounds that the challenge was untimely, so that there was no decision on the merits of this study in establishing jury discrimination.

9.   There was some difficulty in dating precisely the month in which certain qualified jurors were routinely excused, but this should not affect the present report, based on questionnaires of 1150 jurors who made venire lists. About two dozen persons were excluded from further analysis at this point because of high amounts of missing data.

10.   Changes in this period were confined to minor adjustments of criteria for excuse or qualification. For example, the words "who can show no available substitute" were added to the category "sole proprietors of businesses."

In 1970 the Census Bureau collected detailed information on a randomly selected 15 percent of all households in each state. This sample has been further reduced by the Bureau through randomly selecting one out of every fifteen households sampled. The resulting sample (with names, street addresses, and small locality information removed) is known as the One Percent Public Use Sample; it served as the primary data source for a normative model. In particular, an extract of the original census tape was made, taking data for Essex, Middlesex, Worcester, Suffolk, Norfolk, Plymouth, Bristol, Barnstable, Dukes, and Nantucket Counties.[11] All information about individuals was retained but superfluous information about households, such as the number of television sets, type of plumbing, etc., was deleted. Only persons older than 21 were included in this extract because, for the time period studied, those younger than 21 could not legally register. Since records of all individuals resident in the same household were grouped together, we were able to use a computer to identify a good number of respondent social, economic, and racial characteristics necessary for the simulated application of qualification, exemption, and excuse rules. The resulting data file contains information on 31,297 people (representing a population of 3,129,700).[12]

The quality of the census data is fairly high, although government estimates are that several million people, including a disproportionate number of blacks, are missed each decade by census enumerators. This means that census-based random estimates will underestimate population proportions for blacks and certain other minorities. For present purposes, this makes our testing procedure a conservative one, because it is *harder* to prove underrepresentation of blacks in jury lists when using an underestimate of the black population.[13] The same argument is likely to hold for other groups hard to find at census time.
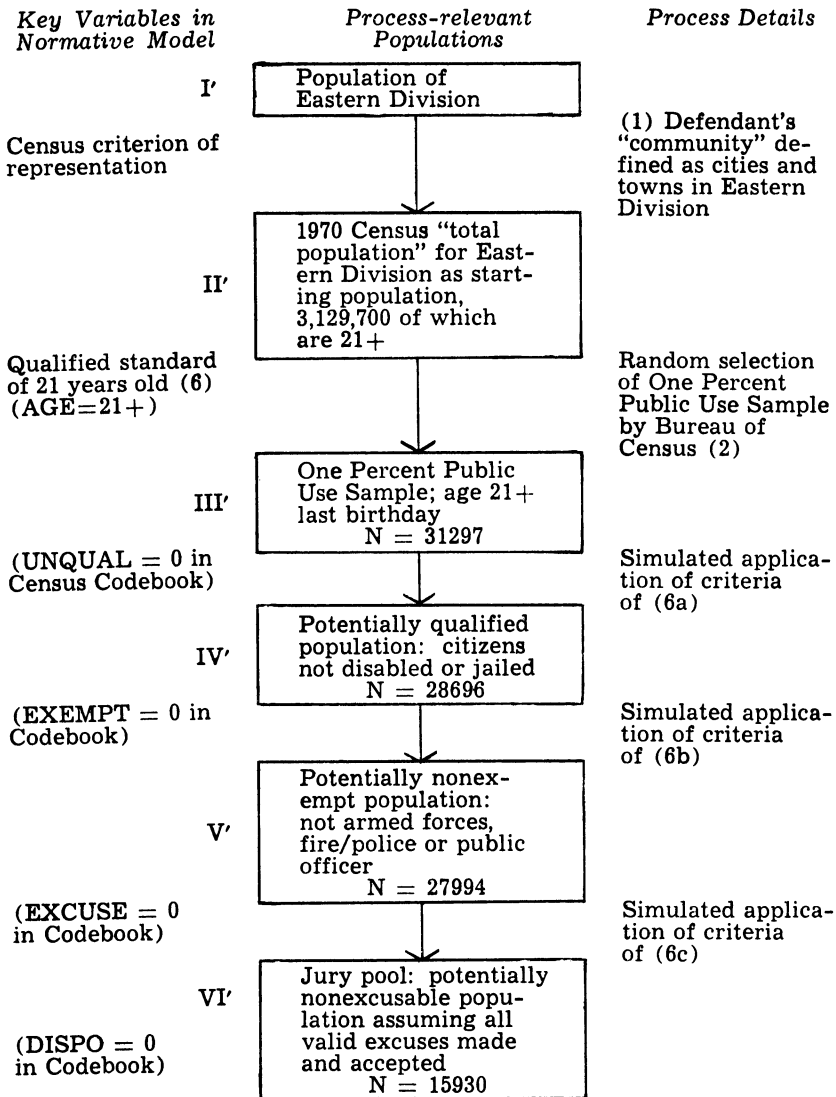
D. Details of the Normative Model

Against this background, we shall review the construction of our alternative census-based normative model, using Figure 2

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11. Given the way the census groups counties, a few neighboring Rhode Island citizens were also included in the first stages of the census estimates, an inaccuracy we have found to be without statistical consequences.

12. Complete information on the items of data included in the file can be obtained by reference to the *Census Users' Guide* published by the U.S. Bureau of the Census, and our Codebooks (copies available from the authors on request).

13. This weakness of census reporting has been publicly acknowledged by the Census Bureau, but we have not yet been able to get a good enough estimate of black underrepresentation to justify increases in our tabulated racial percentage data.

FIGURE 2

A 1970 CENSUS-BASED ALTERNATIVE RANDOM MODEL

Key Variables in Normative Model	Process-relevant Populations	Process Details
I′	Population of Eastern Division	
Census criterion of representation		(1) Defendant's "community" defined as cities and towns in Eastern Division
II′	1970 Census "total population" for Eastern Division as starting population, 3,129,700 of which are 21+	
Qualified standard of 21 years old (6) (AGE=21+)		Random selection of One Percent Public Use Sample by Bureau of Census (2)
III′	One Percent Public Use Sample; age 21+ last birthday N = 31297	
(UNQUAL = 0 in Census Codebook)		Simulated application of criteria of (6a)
IV′	Potentially qualified population: citizens not disabled or jailed N = 28696	
(EXEMPT = 0 in Codebook)		Simulated application of criteria of (6b)
V′	Potentially nonexempt population: not armed forces, fire/police or public officer N = 27994	
(EXCUSE = 0 in Codebook)		Simulated application of criteria of (6c)
VI′	Jury pool: potentially nonexcusable population assuming all valid excuses made and accepted N = 15930	
(DISPO = 0 in Codebook)		

as a reference guide. Note how Figure 2 goes beyond the heuristic scheme of Figure 1 to become a completely rigorous, fully operational simulation model. Our focus here will be on operationalizing variables comparable to those used in the 1970 Plan, especially in its qualification/exemption/excuse rules. This will allow informed judgments of the "fairness" of voting list sources, Plan procedures, actual selection practices, and the resulting pool of empanelled jurors. It will also allow operational definitions of the "fair cross section" concept in terms of the different starting, intermediate, and final populations generated by the model

of Figure 2, plus analyses of the stages, if any, at which significant biases are introduced.

Looking at the figure, we immediately see that a major difference in our normative model is the use of the entire Eastern Masschusetts census population over 21 (box II'), which provides a source of potential jurors broader than the registration lists. Census samplers, rather than the Clerk, have done the relevant random sampling from this population to arrive at the 31,297 individuals who represent a one percent sample of those older than twenty-one. The main reason for departing from court-sanctioned voting lists at this stage is, of course, to allow a *test* of the results of Plan-based procedures (those summarized in Figures 1 and 3) using data that are more clearly representative.

Boxes III'-VI' represent the separate application of simulated qualification, exemption, and excuse criteria. The boxes containing the resulting potentially "qualified," "nonexempt," and "nonexcusable" populations are compared with actual jurors in more detail below. Note how the size diminishes as the simulated selection process is applied: 28,696 were potentially qualified, 27,994 potentially qualified and nonexempt. For comparative purposes, in the construction of our normative model we have also simulated a "potentially nonexcusable population" in order to see if any discovered biases could be accounted for merely by the heavy use of excuse options. Assuming all ascertainable possibilities of excuse were requested and granted, 15,930 individuals remain in the "potentially nonexcusable population."

Let us first examine the qualification question in more detail. All the categorical disqualifications of the Plan are identifiable in the census data except for those relating to the ability to speak, write, or understand the English language.[14] The census specifies noncitizens and persons younger than twenty-one. It also includes information on work disabilities and residence in various types of hospitals and nursing homes. Persons who were institutionalized or totally disabled were coded as unqualified under section 6(a)(4) of the Plan. Finally, the Plan disqualified those who have been convicted of a felony, or have such a charge pend-

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14. It is possible that a large number of those who would be disqualified by language considerations were already disqualified, in both our simulation and in the actual process, because of citizenship, disability, or being in jail. To test the possible effect of illiteracy, we made an extreme assumption that any person with less than six years of education (as identified in the census) would be disqualified. Analysis based on this assumption, not reported here, did not yield results different from those reported.

ing against them. Although the census does not isolate such peo-
ple, we did categorize as disqualified those in jail on census day.
This category probably includes many who were incarcerated on
charges other than felonies and excludes those convicted but re-
leased after serving time. These groups are very similar, how-
ever, in terms of the social characteristics that interest us (race,
age, sex, education, place of residence). Thus we felt that this
category represents a good estimate of those who should be ex-
cluded on this ground.[15]

Table 1 summarizes the results of our simulated qualification
process as applied to the Eastern Massachusetts One Percent
Public Use Sample of those older than 21.

TABLE 1

How Many are Unqualified, for What Reasons?

(Results of simulated application of ascertainable qualification
rules to the Eastern Massachusetts One Percent Public Use
Sample of those older than 21.)

Variable Category and Label in Census Codebook	Population Size	Percentage
Not a Citizen (UNQUAL = 1)	1032	3.3
Disabled (UNQUAL = 2)	1534	4.9
In Jail (UNQUAL = 3)	35	0.1
Potentially Unqualified	2,601	8.3
Potentially Qualified	28,696	91.7
TOTAL SAMPLE	31,297	100.0

With respect to exemption, an almost exact elimination of
the categories defined by 6(b) of the Plan is possible. Fortu-
nately the census occupation classification data are nearly perfect
in this regard (the relevant table of codes can be found in the
Census Users' Guide). Decisions made by court clerks are un-
likely to be based on more accurate reports. Table 2 summarizes
the relevant results.

As for excuses, we were able to measure almost all of them
and proceeded (for comparative purposes) to make the useful
extreme case assumption that all possible excuses would be in-
voked and accepted. Of course, we do not think that this assump-

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15. It should be noted that the application of these and all other cate-
gories is cumulative since they may overlap to some degree. In the
case of qualification, all noncitizens were identified first, then the
rest of the population was searched to find the disabled, and finally
those in jail were identified. Thus a noncitizen who was in jail, for
example, would be classified under the noncitizen category. A dis-
abled person who might be in jail would be classified as disabled.

TABLE 2

How many are Unqualified and Exempt, for What Reasons?

(Results of simulated application of ascertainable exemption rules to the potentially unqualified and qualified populations within the Eastern Massachusetts One Percent Public Use Sample of those older than 21.)

Variable Category and Label in Census Codebook			Population Size	Percentage
Potentially Unqualified			2,601	8.3
Potentially Qualified but Exempt			702	2.3
	Pop. Size	Percentage		
In Armed Forces (EXEMPT = 1)	398	1.3		
Fire or Policeman (EXEMPT = 2)	244	0.8		
Judge or Public Officer (EXEMPT = 3)	60	0.2		
Total potentially unqualified or exempt			3,303	10.6
Potentially qualified and nonexempt			27,994	89.4
TOTAL SAMPLE			31,297	100.0

tion is entirely realistic, but it is useful in seeing the implications of current jury selection practices under the Plan.

The census data fit very nicely the ascertainable excuse categories of 6(a) within the Plan. Reliable data on residence more than two hours or 80 miles distant from the court are not available because the census only groups 5.6 percent of the sample population in a low population area identified as Barnstable, Dukes, and Nantucket Counties, much of which is rather far from Boston. Since the census tapes included information on all persons in a household, and grouped these persons together, we were able to identify households containing children younger than sixteen years old, and attributed their care to adults in the household according to specific rules (e.g., mother, father if no mother present, nearest related female if no mother or father present, nearest related male if no related females present).[16] We could not find information on those caring for the aged, proprietors able to obtain substitutes, or recent jury service. Nonetheless, our confidence in the socioeconomic representativeness of basic categories of potentially unqualified, exempt, or excused is high because of the small sizes of the unrecorded, untapped populations, e.g., illiterates or those responsible for the aged or infirm.

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16. This procedure has an admitted assumption that females are in charge of caring for children, an assumption that may be incorrect in rare instances but is likely to be a valid empirical generalization.

TABLE 3

How Many Might be Excused, for What Reasons?

(Results of simulated application of ascertainable excuse rules to the potentially qualified and nonexempt population within the Eastern Massachusetts One Percent Public Use Sample of those older than 21.)

Variable Category and Label in Census Codebook			Population Size	Percentage
Exempt or Unqualified			3,303	10.6
Potentially Qualified, Nonexempt but Excusable			12,064	38.6[a]
	Pop. Size	Percentage		
Older than 70 years (EXCUSE = 1)	3090	9.9		
Minister of Religion, etc. (EXCUSE = 2)	37	0.1		
Care of child (EXCUSE = 3)	5567	17.8		
Physician or Nurse (EXCUSE = 4)	556	1.8		
Teacher (EXCUSE = 6)	1093	3.5		
Attorney (EXCUSE = 7)	42	0.1		
Sole Proprietor (EXCUSE = 8)	1676	5.4		
Total Potentially Unqualified, Exempt, Excusable			15,367	49.1
Total Potential Jury Pool			15,930	50.9
TOTAL SAMPLE			31,297	100.0

a. Rounding error accounts for difference from 38.5%.

Table 3 again cumulatively represents the results of our extreme case normative simulation. We will discuss the significance of these figures later, in comparison with analogous results from the Jury Qualification Questionnaire. Here we should note gross percentages. That 38.5 percent are potentially excusable, even though qualified and nonexempt, is the most eye-opening result. We must reemphasize, however, that an extreme case is being simulated—all current legal excuses are requested and granted. Statistically, it appears that the excuses of childcare, age, business proprietorship, and teaching, in that order, are likely to have the largest impact on jury composition if they are invoked.

III. AN EMPIRICAL ASSESSMENT OF THE JUROR SELECTION PROCESS

Now we turn from our normative model of jury selection

to an empirical assessment of the actual process. This completes our transition from the court's Plan, theoretically conceived in Figure 1, through a census-based alternative realization in Figure 2, to the complicating facts of everyday court practice as reflected in the empirical model of Figure 3.

Our research on the actual juror selection process has been based on four sources of information:

a. Interviews with court officers;

b. Observation of the empanelling process, together with the materials used in the selection of names for the Master Jury Wheel and Qualified Jury Wheel;

c. The perusal and coding of over 4000 Jury Qualification Questionnaires from the 1969-72 period;

d. The coding, punching, estimation and preliminary statistical analysis of 1150 questionnaires filled out by virtually all those enrolled on 1970 venire lists. In each of these efforts judgmental factors play a role. When serious uncertainties still exist about how the juror selection process works, they will be noted below.
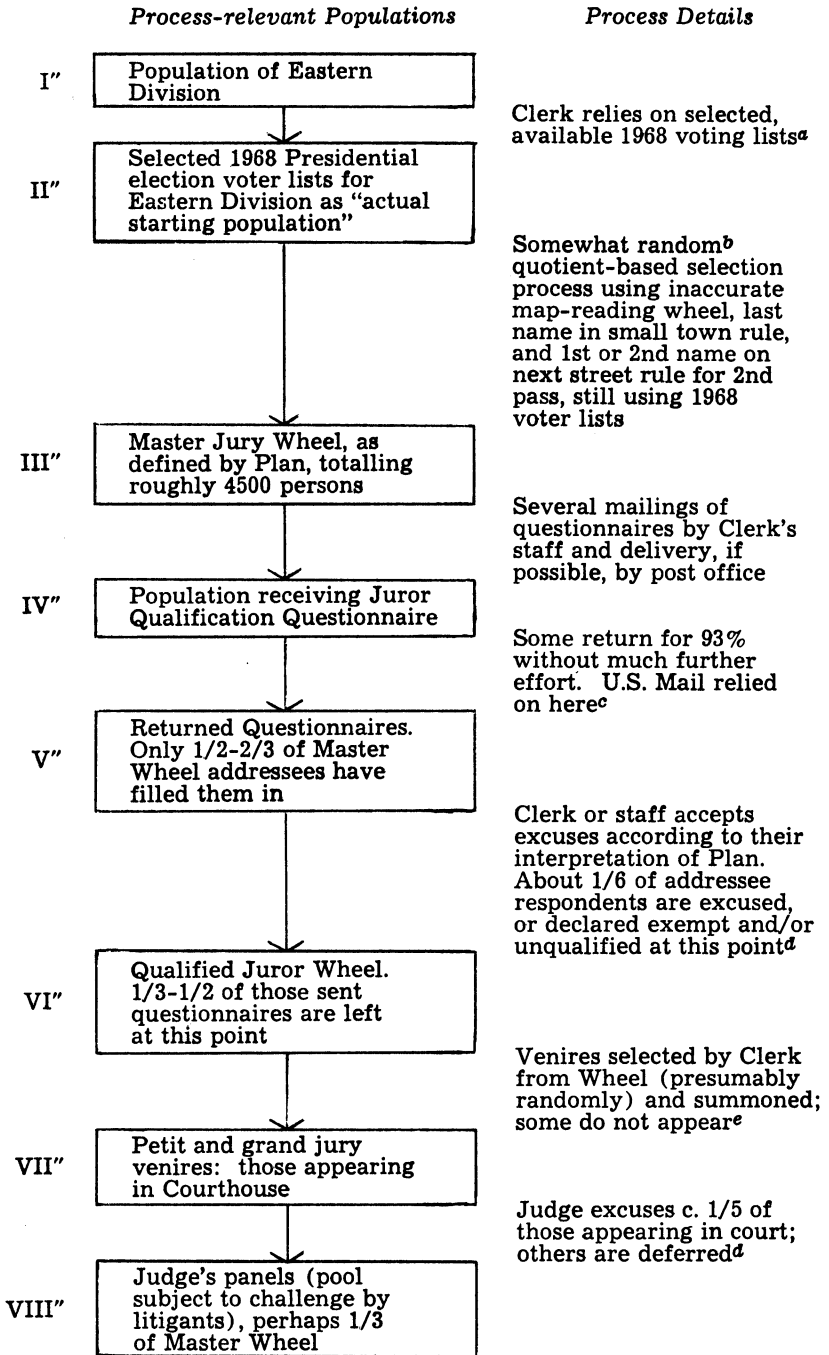
A.   An Empirical Description of the Selection Process

Figure 3 schematically summarizes the principal features of the actual selection process, as we have come to understand it. Since we cannot formally state selection rules at each stage, the figure cannot yet be stated as a formal model. As a descriptive, summary statement, however, we use it to facilitate comparison with the normative model of the last section. In calling this an empirical description as a nonformal model, we appeal to observable evidence and intersubjective experience, suggesting findings and hypotheses susceptible to further data-based checks either by ourselves or by those critical of the accuracy of our analysis.

Looking over the figure, we note four stages that deserve special attention because of their departures from the 1970 Plan, as normatively outlined in Figure 1. First, and perhaps most significant, is the reliance of the Clerk on Presidential election voting lists for the period that we assume started sometime after the 1968 election, according to 4(b) of the Plan (or its predecessor), and ended on February 1, 1973. In our April 1973 visits to the court, we saw 1968 election lists marked with red numbers going up to about 4500, and then blue or greeen lines numbered consecutively above that up to the 9000 range. Some of the smaller towns were reportedly omitted from the lists used in the selection process. Interviews and a court report on the Operation

FIGURE 3

AN EMPIRICAL SCHEME OF THE JUROR SELECTION PROCESS, 1969-1972

Process-relevant Populations   *Process Details*

I" | **Population of Eastern Division**

Clerk relies on selected, available 1968 voting lists[a]

II" | **Selected 1968 Presidential election voter lists for Eastern Division as "actual starting population"**

Somewhat random[b] quotient-based selection process using inaccurate map-reading wheel, last name in small town rule, and 1st or 2nd name on next street rule for 2nd pass, still using 1968 voter lists

III" | **Master Jury Wheel, as defined by Plan, totalling roughly 4500 persons**

Several mailings of questionnaires by Clerk's staff and delivery, if possible, by post office

IV" | **Population receiving Juror Qualification Questionnaire**

Some return for 93% without much further effort. U.S. Mail relied on here[c]

V" | **Returned Questionnaires. Only 1/2-2/3 of Master Wheel addressees have filled them in**

Clerk or staff accepts excuses according to their interpretation of Plan. About 1/6 of addressee respondents are excused, or declared exempt and/or unqualified at this point[d]

VI" | **Qualified Juror Wheel. 1/3-1/2 of those sent questionnaires are left at this point**

Venires selected by Clerk from Wheel (presumably randomly) and summoned; some do not appear[e]

VII" | **Petit and grand jury venires: those appearing in Courthouse**

Judge excuses c. 1/5 of those appearing in court; others are deferred[d]

VIII" | **Judge's panels (pool subject to challenge by litigants), perhaps 1/3 of Master Wheel**

a. This practice is apparently a misreading of the Plan, sections 3(a) and 4(b), which require emptying and refilling the Master Jury Wheel every November after a normal Presidential election, together with the use of annual voter registration lists.
b. Despite a quotient of 498, we found that the number of names between those chosen ranges from 469 to 499, allowing room for sexual or

ethnic discrimination. The treatment of small towns is alphabetically biased; the choice of 1st or 2nd names on the next street on a second pass discriminates against those in urban areas living on highly populated street segments. Some towns were excluded.
c. Estimates based on 1972 interviews and a more recent study of questionnaire returns. Interviews with R. Peck (retired clerk) suggested a 99% response rate which we now feel to be too high. Returns were presumably higher in 1969, but even then the bias against the young and the mobile is apparent.
d. Although the second part of the excuse process occurs after the Qualified Juror Lists are prepared, such review appears to be an important way of supervising and modifying the juror selection process, and requires further detailed study.
e. Nonappearance at this stage may result in bias, similar to that introduced by the nonreturn of questionnaires. This is an area which might be fruitfully explored, but was not included in our analysis.

of the Jury Selection Plan, submitted April 22, 1971, confirmed that the same lists were indeed used to add 4500 names to the Master Jury Wheel in April, 1970. A subsequent major refill came near the end of the 1968-1972 period. Yet provision 3(a) of the Plan and stage I-II of the normative model of Figure 1 refer quite explicitly to voting lists prepared annually. Apparently, the provisions in 4(b) that the Clerk shall empty and refill the Master Jury Wheel every fourth February 1, and the allowance of a judicial order of "additional names to be placed in the Master Wheel at other times as needed" have been interpreted in a fashion contradicting the requirement of 3(a) of the Plan that "voting lists be prepared annually." New residents or new registrants in the Eastern Division are obviously underrepresented in the selection process for this reason. The underrepresentation of the 21-25 age bracket, for example, is insured by this practice, and exacerbated by the failure to use even the 1970 registration lists.

A second problem with the actual process concerns the potential for sex, ethnic, or residential discrimination created by the somewhat unsystematic way in which names have been chosen from the Presidential year registration lists. According to 2(a), 2(b), and 3(b) of the Plan, the Master Jury Wheel should be selected from these lists, with the Clerk performing all discretionary tasks in a truly random way. However, several additional biases can, and do, creep into this process, whether or not they are intentional. Thus after choosing a quotient figure of 498 and random starting places for each city or town, the Clerk or his staff in 1970 used a map reading wheel to run down the voting lists the appropriate distance. Because street or precinct names unevenly divided up these lists, and for other reasons, it is virtually impossible to select the 498th name precisely in this manner. Our manual counts of consecutively numbered names between those selected varied from 469 to 499. Such differences

clearly allow discretionary preferences or prejudices in the choice of jurors by sex or according to names that are ethnically identifiable.

Because the last name is occasionally selected from those few towns with a registered population less than the quotient figure, a rather innocuous end-of-list bias also occurs.[17]   More serious is the procedure adopted when the Clerk makes a second pass through the lists to refill the wheel. Lists are compiled by precinct and names are grouped on the voter lists by address, with all those living on the same street-segment arranged together. If, in the second pass, the Clerk encounters a name that is in a street-segment from which a name was drawn on the first pass, he substitutes the first or second name from the next street on the list.   Thus, if all the names on Pearl Street are arranged after the names on Diamond Street, and a person had already been chosen from Diamond Street on the first pass, the first or second name on Pearl Street would be selected on the second pass. In many urban neighborhoods, several hundred people may live on some streets and may have characteristics that differ greatly from those who live only a block away. Be these groups rich, poor, black, or white, random selection would choose those living on long street-segments more often than does the present procedure.

The amount of bias introduced by these procedures could only be discovered by time-consuming detailed replication of the process, but they may result in underrepresentation of certain groups.

Third, and most surprisingly, Figure 3 shows that a large fraction of those sent questionnaires never receive them, or do not send them back. About half of those sent questionnaires were eventually included on the Qualified Jury Wheel. Another estimate was that in 1972, the year furthest removed from the 1968 registration list, fully one-half of the 300 regularly mailed questionnaires were returned marked "deceased," "moved," or "addressee unknown." However, a 1971 court questionnaire "on the operation of a jury selection plan," sent

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17. Depending on how lists are drawn up, reliance on the last name may yield a population systematically different from a truly random selection.   This is most obvious in cases of alphabetical listings.   If names beginning with Y or Z are always chosen (or excluded), some ethnic groups may be over- or undersampled. Since we are not sure of the way in which voting lists are arranged for each town and cannot predict in each case who lives on a corner or at city limits (the most likely people to be at the end of the list), we expect that any bias in jury selection stemming from reliance on the end of the list would be slight.

to those on the 1970 Master Wheel, was returned by five-sixths of the addressees, and increased to eleven-twelfths by a four-stage followup process. In 1972, about one-third of those returning questionnaires requested and were granted excuses at some point. After reconciling such diverse estimates, taking into account the fact that the latter judgments were made in the last years of the 1969-1972 cycle, the impact of the stages III″-VI″ is still surprising. It appears that more than one-half of the 1970 questionnaire sample of registered voters did not become part of a venire list. Perhaps a third of those on the Master Jury Wheel during the 1969-1972 period actually served in juries.

Thus, despite the imprecision of the evidence, it all points toward the "unreturned questionnaire" problem as a potentially serious one, adding to the large number of people excused or deferred for various reasons. Recall that the Plan paid no attention to the process transforming Population IV into Population V, a process we included in the normative model for completeness (Figure 1). Clearly the unreturned questionnaires are partly due to the high residential mobility of the American population. In our census sample from the Eastern Division in April 1970, 4,320 out of 31,297 of those 21 or older (i.e., 14 percent) had not been Massachusetts residents in April 1967, the cut-off date for the 1968 registration list. Because mobility is even higher within the state, the post office is often unable to forward mail. The urban poor are often said to be especially mobile, as are those just entering the work force or enrolled in institutions of higher education. Surely more deaths occur among older citizens, who tend to be less mobile and thus more likely to be registered, than among the population as a whole. Failure to update registration lists unquestionably exacerbates this problem. Further insights into the consequences of these procedural problems should be gained in the analysis below.

Finally, it is worth noting that the excuse process occurs in two parts. According to section (6) of the Plan (Figure 1), judicial determination of the qualified, nonexempt, nonexcused jurors should take place in stage V-VI. In fact, as reported in interviews, prospective jurors are initially excused, exempted, or deemed unqualified by the Clerk or his staff largely on the face of their questionnaire responses. This subprocess (V″-VI″ in Figure 3) is presumably under general judicial supervision, and excuse decisions are presumably based on faithful application of the rules of the Plan then in force. But when a venire is actually summoned to the court for jury duty and the job explained more fully, each prospective juror is given a second opportunity to ask

the judge for an excuse. A large fraction does so, and something like a fifth are reported to be excused; a few have their jury duty deferred. The venire data we have do not tell us who actually gets to the next stage of being considered for a particular jury; payment vouchers, if available, might be used for this purpose.

This second part of the excuse process (VII″-VIII″), although not in the plan, obviously means that the judge has an opportunity to supervise the more routinized parts of the selection process, as well as to elicit bases for nonqualification, exemption, or excuse that the questionnaire did not fully or clearly invoke. It certainly allows the Clerk or his staff to be less discretionary by postponing difficult decisions until the prospective juror arrives at court. And it may lead (and probably has led) to revisions in the Plan, possibly reflected by the periodic changes of minor details.

From an empirical perspective, we conclude that the two-part qualification/exemption/excuse process (V″-VI″, VII″-VIII″) also has a major impact on who is empanelled and ultimately serves as a juror. Something like half of those Massachusetts residents personally returning Jury Qualification Questionnaires reach the effective pool of stage VIII″. In retrospect, the census-based normative model (Figure 2 and Table 3) produced a similar proportion: hypothesizing all ascertainable excuses to be operative led to a jury pool of 51 percent.

Although our data and current judicial standards both require that the fairness of jury venires be judged at or before stage VII″, an implication of our findings is that a more accurate determination would be made from a subset of the Qualified Juror lists, namely, those not judicially excused thereafter. Our rough estimate is that the number of excuses or deferrals approximates the 38.5 percent maximum previously simulated. But even if we assume that the results of the actual two-part excuse process are a fair and judicious application of Plan criteria, we wonder if the qualification and excuse options in the Plan may themselves be responsible for biases in the juror selection process.

B.   On the Unrepresentativeness of 1970 Jury Venires

We now are ready for a careful look at the actual composition of jury venires, as they are chosen from the Qualified Juror lists, but before the judge personally excuses or defers some of them and empanels the rest. Rather than examine particular venires, we have focused on a pool of 1150 persons on the Qualified Juror

list, representing all those we could find who were chosen in 1970 as venire members. This population is virtually the entire 1970 jury pool for grand and petit juries. It is a large enough population for statistically reliable comparisons with census data on the Eastern Division of Massachusetts.[18] It is also large enough to serve as an indication of the kinds of citizens who are likely to appear on jury venires, whether or not they serve in a particular jury. At least for those placed on the venire lists, responses to Jury Qualification Questionnaires are unusually complete, compared to many other types of official records.

In legal discussions of jury representativeness, a "fair cross section of the community" has come to mean one in which no "cognizable class" is seriously discriminated against. We shall use several standard, sociological categories for studying which groups, if any, are underrepresented in the jury pool. Our primary ones are race, sex, age cohorts, socioeconomic class, and urban/rural residence. Categories defined by multiple variables, like the representation of black women younger than 40, will also be discussed, as well as component indicators of more complex concepts like socioeconomic class.

Our selection of these categories is largely a product of our earlier hypotheses about possible legally relevant jury pool biases. Also important is the existence of relevant and comparable information in both the Jury Qualification Questionnaire and the One Percent Public Use Census Sample.

Before presenting the relevant comparisons, it may be helpful to pinpoint the standards we are using to define bias. The basic norm is that major, distinctive social groupings in the Eastern Division of Massachusetts should be randomly, but proportionately represented over time on the Qualified Jury Wheel. Discrimination is present when a group gets "significantly" less of

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18. The concept of statistical reliability we shall use below is the same as that of statistical "significance" as explained in David Kairys (1972) and in such standard textbooks as Blalock (1960) and Siegel (1956). A difference in sample proportions is statistically significant at the .01 level if, on the assumption of no true population difference, only one random sampling effort in 100 would lead to sample differences of that magnitude or larger. Calculations of "significance" depend, therefore, on the magnitude of observed sample differences, the randomness of their selection, and the adequacy of the derived probability calculation. Orthodox statistical theory provides a strong basis for such calculations when sample *sizes* are large enough (50 or more). For very small samples or very extreme proportions (like 1 in 10,000) a different logical basis may be required for secure, reliability/significance calculations. Significance interpretations are appropriate guards against nonextreme random coding and measurement errors as well, but they do not detect systematic biases (like census undersampling of blacks) nor do they guarantee causal significance to reliably observed differences.

a share of the jury pool than the proportion to which it is enti-
tled   We will compare the 1970 jury pool with the corresponding
ce₁sus population, before and after simulated qualification ex-
emption and excuse rules have been applied to it.[19]

Racial biases. Table 4 gives such a comparison for racial
data. If we require jury pools over time to be representative

TABLE 4[a]

UNDERREPRESENTATION OF MINORITY RACIAL GROUPS IN THE
1970 JURY POOL

(Comparing data estimates from Tables 1-3 with those for Figure 3)[b]

RACE	Census Starting Population	Census Potentially Qualified Population	Census Potentially Nonexempt Population	1970 Jury Pool	Census Potentially Nonexcusable Population
Whites	96.7%	97.0%	97.1%	98.7%	97.0%
Blacks	2.6 (826)[c]	2.5 (711)[c]	2.4 (685)	1.1 (12)	2.5 (403)[c]
Orientals	0.5 (163)[c]	0.3 (99)[c]	0.3 (87)[c]	0.1	0.3 (48)[c]
Others (including Indians)	0.2	0.2	0.2	0.1	0.2
	100.0% (N=31,297)	100.0% (N=28,696)	100.0% (N=27,994)	100.0% (N=1,095)[b]	100.0% (N=15,930)

a. In this and subsequent tables, the possible effect of the excuse process
is emphasized by placing the potentially nonexcusable population after
the actual jury pool. This is done to isolate the contribution of that
process to differences that may be found between the pool and the poten-
tially nonexempt population.
b. All contrasts for whites, blacks, and orientals are significant at the
.01 level at least. Because direction of difference was predicted, we do
not worry about random significance levels.
c. There were about 100 persons for whom racial data was not obtained
from the questionnaire. A few were reached by telephone by a pro-
fessional polling interviewer and their responses included here. Of 55
still not racially identifiable, a check of the published racial composition
of their residential block, tract, or town suggests that only one is black,
thus in no way distorting the low black racial percentage noted above,
significant at the .001 level.

19. A .01 significance level for a comparison of proportions in these two
     populations means that we are 99 percent sure that a discriminatory
     difference could not have happened by chance for two populations,
     which in fact had equal response characteristics. Minimal propor-
     tion differences with this, and a .001 significance level, are given in
     the following tableau:

		Smallest proportional difference that is sta- tistically significant from two samples when sample proportions are both:			
		very extreme (.99)	extreme (.98)	mod- erate (.75)	even (.50)
One way significance level:	.01	.007	.011	.03	.04 (=4%)
	.001	.0094	.014	.04	.05 (=5%)

     Calculations are based on sample sizes of approximately 31,300 and
     1,050 and the difference in proportions formula in Blalock (1960:
     section 13.3).
         For example, if there is a census population that is 30 percent

of the entire residential population of the Eastern Division, blacks should represent 2.6 percent, but in fact they constitute only 1.1 percent, of the 1970 jury pool. In these terms they get only about 41 percent of their "fair share" of jury pool places.

Were the objection raised that blacks are differentially unqualified for jury duty, our simulation model of Figure 2 allows us to assess whether they receive their due among potentially qualified populations. (Note that certain inaccuracies in simulation model estimates tend to cancel out in proportional, percentage, or ratio data.) From the second column of Table 4, we see that there is a small grain of truth to this argument, corresponding to a social bias in the qualification rules themselves. Yet blacks and orientals are still significantly underrepresented on jury venires when compared to their proportions among potentially qualifiable residents. The chances for blacks of making the Qualified Jury Wheel are still low: .47 (1.1 percent/2.5 percent) or less than half a fair chance of appearing there. And if we look at the nonexempt, qualified population, blacks still get less than half a fair chance of being in the jury pool.

Where does this large discrepancy come from? A strong reason for suspecting the starting population, the voter registration lists, is that even a wholesale application of the excuse process (including temptations to set higher qualification standards for blacks) makes little difference, and even slightly increases the percentage of nonexcusable blacks in the fourth column of Table 4. One source of difficulty is the original undersampling of blacks due to a reliance on voter registration lists. Of the other processes shown in Figure 3, the decisive one is likely to be the failure to return the questionnaire because of the higher mobility of the black population.

Age and Sex Discrimination. Women make up 53.9 percent of the starting population, but occupy a significantly smaller 45.3 percent of our venire list places. The 1971 report showed the same discriminatory pattern: 54.1 percent of the sample from the Master Wheel (based on registration lists) were women, but only 42.6 percent of those making venires were female, again a highly significant drop of approximately the same magnitude.

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urban, a 25 percent urban jury pool suggests that urbanites get 25/30 or 83⅓ percent of their fair share of places. Moreover, they are significantly underrepresented at the .001 level: a 5 percent (or .05 proportion) difference is larger than the .03 difference we would expect to occur once in a 1000 independent random samples of the specified size drawn from identical populations. Even if both populations are actually equal, a 5 percent difference has less than 1 in a 1000 chances of randomly occurring.

The percentages do not change very much after ascertainable qualification and exemption rules are applied, indeed the potentially qualified and nonexempt population has an even higher proportion of females, 54.8 percent.

Here is a case where the ability to simulate the excuse process in detail helps explain why sex biases occur. Were all excuses allowed, our simulated estimate is that males would get an even larger share of jury positions (60.1 percent) than they actually do (54.5 percent). From a starting population derived from voter lists, which contain a majority of women, the exemption/excuse process differentially selects them out. Several explanations for these findings are plausible: almost a third of the women are responsible for the care of a child but none of the men; more women than men are older than 70 (11.6 percent vs. 7.8 percent); more women than men teach (4.4 percent vs. 2.5 percent); and women are more numerous than men within the category of doctors and nurses (2.8 percent vs. 0.6 percent).

An equally strong case can be made for the existence of age discrimination. Limiting ourselves to the potentially qualified, nonexempt population in our census-based normative model, we find that both the old and the young are underrepresented in the jury pool.

TABLE 5

UNDERREPRESENTATION OF THE OLD AND THE YOUNG

	Age cohort							
	21-25	26-29	30-39	40-49	50-59	60-69	70	Σ
Jury Pool	5.0%	5.7%	16.6%	26.9%	24.0%	17.4%	4.4%	100%
	(57)	(66)	(191)	(309)	(276)	(200)	(51)	1,150
Direction and significance of relation[a]	⌃⌃	⌃⌃		⌄⌄	⌄⌄	⌄⌄	⌃⌃	
Potentially qualified, nonexempt Census sample	12.5%	8.8%	17.4%	19.1%	17.2%	13.1%	11.9%	100%
	(3,501)	(2,458)	(4,864)	(5,360)	(4,810)	(3,673)	(3,328)	27,994

a. All the directionally indicated relationships are significant at the .001 level, and are consistent with a hypothesis that middle age is over-represented.

Given the lag inherent in the use of 1968 registration lists in later years, the low showing of the 21-25 cohort is not surprising, but it is still troubling: young adults get 37 percent of a fair chance to be on a venire list. The serious underrepresentation of the entire "under 30" adult population is surely very striking. Although they constitute 21.3 percent of the potentially qualified population, this group gets only 10.7 percent of the jury

pool places, just about half what one would expect them to have.

But why is there a dearth of jurors younger than 30 or older than 70? Could it be the excuse process? Given the tendency of voter registration lists to overrepresent the elderly, the right to be excused markedly reduces the relevant qualified census population (11.9 percent of whom are older than 70) to a mere 4.6 percent of the venire lists. On the other hand, simulating the maximum possible excuse process for those younger than 30 we find that 25.1 percent of males and 20.0 percent of females are still nonexcusable, although only 10.7 percent of both sexes get jury pool places. The conclusion must be that this bias derives both from reliance on out-of-date registration lists and the unrepresentativeness of those lists themselves.

Some of the biases in representation are cumulative. If women, blacks, and the young are each underrepresented, we should expect young black females to be even more underrepresented. Table 6 shows that this is true. There were *no* black women below 40 in our jury pool of 1095, and only 2 black men in the same age range. Are these figures much lower than we would expect to occur by chance? The census-based normative model again allows us to calculate just how many blacks we should expect in each of the cells of Table 6 if we were racially blind. Blacks are 2.4 percent of the qualified, nonexempt population; thus we would expect 25 to appear at this point in the selection process. The table shows the number of persons in each category appearing on the venire lists compared to predictions based on census data of just how many blacks of each sex-age type we would expect in each cell were the lists unbiased. We see that five to six black women under 40 would be expected but none was found, and that about ten blacks under 40 would be expected, but only two were found. These differences are extremely pronounced, as well as being statistically significant. They cannot be accounted for by the excuse process.

Urban/suburban/rural differences. The Middle American hypothesis led us to expect that inner cities and rural areas would be underrepresented in jury pools. The tendency of inner-city residents to move frequently is well known; that some parts of Cape Cod and the islands to its south exceed the excusable distance should also affect their representation in the venire. Whether there is an overall difference in the representation of urban and rural areas is somewhat less clear.

Table 7 gives the relevant findings. Two indicators were used. First we compared counties, treating Suffolk County (Boston)

TABLE 6

UNDERREPRESENTATION OF YOUNG BLACK WOMEN

(Venire population for each group is given first. Below that the expected nonexempt, qualified population, calculated by referring to census data for the total relevant multiracial adult population, is shown for each group.)

Group	21-25	26-29	30-39	40-49	50-59	60-69	70+	Total
				Age cohort				
Black Women								
on venire	0	0	0	2	1	2	0	5 (0.45%)
expected	2 (0.2 %)	1 (0.1 %)	2 1/2 (0.25%)	2 1/2 (0.25%)	2 1/2 (0.25%)	2 (0.2 %)	2 (0.2%)	14 1/2 (1.82%)
Black Men								
on venire	1 (0.1 %)	0	1	2	2	1	1 (0.1%)	7 (0.63%)
expected	1 1/2 (0.15%)	1 (0.1 %)	2	2 1/2 (0.25%)	2	1 1/2 (0.15%)	1 (0.1%)	11 1/2 (1.05%)
Total Blacks								
on venire	1	0	1	4	3	3	0	12 (1.09%)
expected	3 1/2 (0.3 %)	2 (0.2 %)	4 1/2 (0.4 %)	5 (0.5 %)	4 1/2 (0.4 %)	3 1/2 (0.3 %)	3 (0.3%)	25 (2.28%)
Cumulated by age	25 or younger	29 or younger	39 or younger	49 or younger	59 or younger	69 or younger	total	
on venire	1 (0.1 %)	1 (0.1 %)	2 (0.2 %)a	6 (0.5 %)a	9 (0.8 %)a	12 (1.1 %)	12 (1.1%)a	
expected	3 1/2 (0.3 %)	5 1/2 (0.5 %)	10 (0.9 %)	15 (1.4 %)	19 1/2 (1.8 %)	22 (2.0 %)	25 (2.3%)	

a. These differences, if taken in isolation, would each be significant at the .01 level. Because the whole pattern fits expectations, the overall significance of the biasing effect of age and race is higher.

as central city urban, and Barnstable, Dukes, and Nantucket Counties as rural. Middlesex is typical of the remaining counties in Eastern Massachusetts being somewhat more than peripherally urban, although obviously not purely "suburban." Nonexempt residents of the central city get about 82 percent of a fair chance of making a venire; the Barnstable cluster of rural counties gets only about 25-30 percent of a fair chance to do so, while residents of Middlesex are slightly overrepresented.

TABLE 7

UNDERREPRESENTATION OF BOTH URBAN SUFFOLK
AND RURAL BARNSTABLE, DUKES, AND NANTUCKET

| | A. *Counties* | | |
	Suffolk	Middlesex	Barnstable Dukes, and Nantucket
Census (21+)	4712 (15.1%)	8553 (27.3%)	1753 (5.6%)
Nonexempt	4116 (14.7%)	7720 (27.6%)	1397 (5.0%)
Venire	135 (12.0%)[a]	323 (28.6%)	15 (1.3%)[b]

| | B. *Census Maps* | | |
	Incorporated Centers	Remaining Urban Areas	Rural Areas
Census total population	2,334,046 (47.6%)	1,929,477 (39.3%)	634,049 (12.9%)
Venire	556 (51.4%)	413 (38.2%)	113 (10.4%)[a]

a. Statistically significant at the .01 level in predicted direction.
b. Statistically significant at the .001 level in predicted direction.

Our second approach to urban/rural bias is based on census maps, which highlight urbanized areas. Within these areas, major incorporated cities are further differentiated. Using the distinction between incorporated urban, remaining urban, and rural areas, Table 7 shows that the last is again significantly underrepresented in the venire (81 percent of a fair chance) but not nearly as much as the Barnstable County group, which lies outside the excusable distance. By contrast the most highly urban area is slightly overrepresented.

Socioeconomic class biases. The most important class variable we have is education. Table 8 shows a significant pattern of overrepresentation for moderately educated groups. Those with less than nine years of schooling are significantly underrepresented; those with a postgraduate education are also significantly scarce. It is likely that the excuses available to teachers, ministers, doctors, nurses, and lawyers account for the upper tail of the curve. Simulating the maximum excuse option would reduce the 6.5 percent figure for those with some postgraduate

education to 5.4 percent, close to the actual representation of this group in the venire, 5.1 percent. Preliminary study of the excuse process for those with less than nine years of schooling suggests that it does not have a big impact. Expected venire proportions after all excuses are allowed are still much higher than those observed.

TABLE 8

OVERREPRESENTATION OF MODERATELY EDUCATED PEOPLE
IN THE 1970 JURY POOL[a]

	Percentages				
Level of Education	Census Starting Population	Census Potentially Qualified Population	Census Potentially Nonexempt Population	1970 Jury Pool	Census Potentially Nonexcusable Population
Less than 9 yrs.	19.0	16.8[b]	17.1[b]	11.9††	16.7
Some high school	19.7	19.5	19.5	17.8	20.4
H.S. graduate	33.9	35.1	34.9	38.0†	34.7
Some post H.S.	14.1	14.8	14.7	17.2	16.1
College graduate	6.9	7.3	7.3	9.9	6.6
Postgraduate	6.3	6.5	6.5	5.1[b]	5.4

a. All comparisons between the potentially nonexempt census population and the 1970 jury pool are in the right direction as predicted by the "middle education bias" hypothesis. Those differences marked † or †† are, in isolation, statistically significant in the expected direction. Since the whole pattern fits our expectations, the overall statistical reliability of the hypothesis is even higher.
b. Removal of *all* those with less than 6 years of formal education (i.e., those potentially excusable) reduces these figures by 2.3%, still sufficient for .01 significance.

IV. DESIGNING A FAIRER SELECTION PROCESS

The overwhelming conclusion of this study is *the pervasiveness of the bias in jury selection in favor of those characterized as "Middle Americans" and, conversely, the underrepresentation of racial minorities, the young and the old, the lower and upper socioeconomic classes, the rural areas and the central cities, and women of all ages.* These results hold for the Eastern Division of Massachusetts whether our normative standard is applied to the overall adult population, the potentially qualified population, or—more strictly—those we would expect to be qualified and nonexempt were they given a revised Jury Qualification Questionnaire. Because of the converging streams of evidence supporting this conclusion, it is inconceivable that reanalyses will paint a fundamentally different picture of the jury selection process. The importance of these conclusions for jury selection elsewhere in the United States is obvious, if not yet spelled out. That almost all of our results follow *without assuming malevolent in-*

tent strengthens the case for arguing that we need to redefine the jury selection process.

A. Some Specific Recommendations

How would we design, test, and implement a fairer juror selection process? The existence of feasible alternatives, preferable to current practice, is always a *sine qua non* of substantial reforms. Our analysis suggests three focal points for such efforts: the basis for choosing the starting population, the methods of choosing random and proportionate samples from that and later groups, and the nature of the excuse process. Our recommendations should be seen as tentative reflections, not yet tested out by either simulation or experience.

1. *Alternate lists could be used to supplement Presidential election registration lists.* If computerized, the annual updates kept by Registrars of Voters would help substantially. In many places, the census or police lists could offer a more comprehensive starting point. "Automatic" or postcard voter registration practices would, if implemented, go a long way toward removing age, residential, class, and race biases inherent in current registration practices. Until such procedures exist, supplementing the annually updated registration lists with annual police lists would help.

2. *If a questionnaire is returned marked "deceased," "moved," or "addressee unknown," or if a questionnaire is not returned after a reasonable time, another questionnaire could be sent to the alternate first name at the next address on the list.* A major source of bias against certain groups may be the use of outdated lists. Since a neighborhoods tend to be racially homogeneous, selection of a name from the next address on the list should produce a potential juror of the same race as the one whose questionnaire was not filled out. To the extent that people with similar educational levels live near each other, this method would also reduce underrepresentation of highly mobile persons with other low or high educational attainments.

3. *Automating the preliminary selection process will improve its contemporaneity, remove temptations to discriminate, and provide much better data for judicial monitoring of the fairness of the selection process.* Obviously, use of supplementary lists will require more clerical work unless the registration and updating processes are routinized and automated. The Massachusetts state court system is considering this possibility. Automation would not replace judicial discretion and supervision; rather it could help these processes by strictly random applica-

tions of quotient figures, and by keeping the court better informed about the composition of the populations receiving and answering Jury Qualification Questionnaires, making venire lists, and ultimately being empanelled. The Jury Qualification Questionnaire would have to be augmented and clarified for this purpose. Records of qualification decisions, judicial excuse practices, and jury service would enormously help the court to appraise the selection process we have tried to model. Our normative model of the jury selection process may serve as a contribution to these tasks. Of course, it and corresponding empirical data would require further elaboration. Clearly the court cannot count on occasional litigation and intensive research efforts by poorly funded volunteers to collect the statistical information necessary for adequate supervision.

4. *Within a revised Plan, there are many advantages to retaining the current two-part excuse process, if suitably revised so as not to discriminate against rural populations, the poor, and women.* In the first stage, clerks can act with less fear of arbitrariness. Judges obviously get important insights into the way the random Plan is operating through their examination of those requesting excuses. Certain discretionary choices clearly need to be preserved in this process, and cannot be automated. Knowing that preliminary Qualified Juror lists do represent fair cross sections, judges might be less reluctant to excuse members of apparently underrepresented groups. Confidential studies of the actual patterns of judicial excuse could help judges and clerks to do their work with greater self-awareness, and to update regularly or revise sampling procedures at the earliest stages of the juror selection process.

5. *The nature and the impact of both parts of the excuse process clearly need further review.* We do not have data on the second part of this process, but we can see that it has clear biasing effects against women, rural populations, the poor, and the highly educated. Eliminating some excuses might not be intolerable if adequate child care were made available in the court building, and were well publicized. Travel costs for a small group of rural jurors might be supplemented with hotel accommodations. The Plan has been revised to excuse sole proprietors only when no other work supervisor is available. How many other professional groups or exempted populations might be able to find substitutes? In some cases the length of juror service might be cut in preference to excluding some jurors altogether. If the part-time nature of most federal jury service were better

publicized, this might also decrease requests for excuse by those expecting the full-time duty characteristic of the state system.

B.   On the experimental implementation of these reforms

Were the preliminary selection process to be automated, and the plan suitably revised, a number of reforms could be simulated, experimentally implemented, and monitored. A large record of management experience with information systems already exists. Statistical procedures are available for designing, simulating, or partially implementing trial revisions in procedures. Our computer simulation of the extreme case of excusing all eligibles is a modest but relatively clear example of the kind of work that could be done in this regard.

Clearly, we know enough about the jury selection process to argue that much more can be learned about how it actually functions, and that this knowledge can also improve the administration of justice.

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