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THIS IS TO CERTIFY THAT THE THESIS PREPARED UNDER MY SUPERVISION BY

James M. Mrowicki

ENTITLED: CAUSAL ANALYSIS AND POLICY OPTIMIZING MODELS

AS APPLIED TO THE LEGAL PROCESS

IS APPROVED BY ME AS FULFILLING THIS PART OF THE REQUIREMENTS FOR THE

DEGREE OF Bachelor of Arts

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Stuart S. Nezel
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Acting HEAD OF DEPARTMENT OF Political Science

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CAUSAL ANALYSIS
AND
POLICY OPTIMIZING MODELS
AS APPLIED TO THE
LEGAL PROCESS
BY
JAMES M. MROWICKI

THESIS
FOR THE
DEGREE OF BACHELOR OF ARTS
IN LIBERAL ARTS AND SCIENCES

COLLEGE OF LIBERAL ARTS AND SCIENCES
UNIVERSITY OF ILLINOIS
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INTRODUCTION

The purpose of this paper is to exemplify the quantitative approach that can be used to analyze the legal process. In this context, the legal process is viewed as a stimulus to certain effects and as a response to previous stimuli. This conceptual scheme stresses a causal-quantitative approach rather than a view of the system as a set of rules.

The five examples presented in this paper examine the use of causal analysis and the use of policy optimizing models. The first section examines the use of causal analysis to explain the different decision propensities of judges. The second section deals with the adoption of certain policies in light of maximizing benefits minus costs. The third section examines the threshold probabilities of potential jurists in light of varying characteristics. The fourth section concerns the allocation of resources to maximize benefits. The fifth section examines the optimum level of a policy, in this case, the optimum level of defendants to release on bail. This section will also use causal analysis to explain the effect of certain variables. In all five sections, some space will be devoted to the actual mechanics of data analysis. These five studies present a foundation of methodology and analysis that can be applied to other aspects of the legal process.
SECTION 1 CAUSAL ANALYSIS

The purpose of this project was to determine the causal relationship of a judge's party to his decision propensity in employee injury cases. This analysis also explored the relationship of a judge's liberalism to party affiliation and decision propensity. A judge's party is the x variable and is coded 1 for being a Republican and 2 for being a Democrat. A judge's decision propensity is the y variable and is coded 1 for being at or below the average of his court in deciding for the employee or is coded 2 for being above average of his court. A judge's liberalism is the z variable and is coded 1 for being at or below a score of 109 (conservative) or 2 for being above a score of 109 (liberal). A score of 109 was the average score of the judges who answered a questionnaire concerning their off-the-bench attitudes.¹

The information from the 62 judges, sampled in 1955, was cross-tabulated and the Pearson Correlation program determined the correlation coefficients. Table I determined the relation of being a Democrat and being above the average of one's court in deciding for the employee. Of the Democratic judges, 60.7% (17/28) were above their courts' average in deciding for the employee, while 41.2% (14/34) of the Republican judges were above their courts' average, which is a difference of .195. The difference had a chance probability of 21%.
The correlation coefficient is +.1945.

TABLE I

\[
\begin{array}{c|c|c}
\text{Rep.} & \text{Dem.} \\
\hline
\text{Pro-employee} & 11.2\% & 60.7\% \\
(14) & (17) \\
\text{Pro-employer} & 58.8\% & 39.3\% \\
(20) & (11) \\
\hline
\end{array}
\]

Democrat +.1945 Pro-employee
x -----------------------------> y

The next set of tables shows the relation of party and decisions to liberalism.

TABLE II

\[
\begin{array}{c|c|c}
\text{Conservative} & \text{Liberal} \\
\hline
\text{Dem.} & 25\% & 66.7\% \\
(8) & (20) \\
\text{Rep.} & 75\% & 33.3\% \\
(24) & (10) \\
\hline
\end{array}
\]

TABLE III

\[
\begin{array}{c|c|c}
\text{Conservative} & \text{Liberal} \\
\hline
\text{Pro-employee} & 28.1\% & 73.3\% \\
(9) & (22) \\
\text{Pro-employer} & 71.9\% & 26.7\% \\
(23) & (8) \\
\hline
\end{array}
\]

In Table II, of the judges above average on liberalism (liberal), 66.7\%(20/30) are Democratic, while of the conservative oriented judges 25\%(8/32) are Democratic. This is a difference of .417 with a significance of .24\%. The correlation coefficient of this difference is +.4148.

Liberalism +.4148 Democratic
x -----------------------------> y
In Table III, of the judges considered liberal, 73.3% (22/30) were above their courts' average in deciding for the employee, while 28.1% (9/32) of the conservative judges were above their courts' average in deciding for the employee. This is a difference of .451 and has a chance probability of .1%. The correlation coefficient is +.4518.

\[
\frac{\text{Liberalism}}{z} = +.4518 \quad \text{Pro-employee} \rightarrow y
\]

The next step was to hold constant liberalism and then determine the relation of party to decision. This was done in Tables IV and V.

**TABLE IV Conservative Judges**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pro-employee</td>
<td>29.2% (7)</td>
<td>25% (2)</td>
</tr>
<tr>
<td>Pro-employer</td>
<td>70.8% (17)</td>
<td>75% (6)</td>
</tr>
</tbody>
</table>

**TABLE V Liberal Judges**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pro-employee</td>
<td>70% (7)</td>
<td>75% (15)</td>
</tr>
<tr>
<td>Pro-employer</td>
<td>30% (3)</td>
<td>25% (5)</td>
</tr>
</tbody>
</table>

Table IV contains only the distribution of the conservative judges. In this Table, 25% (2/8) of the Democratic judges were above their courts' average in deciding for the employee, while 29.2% (7/24) of the Republican judges were above their courts' average. The difference is .042 and has a chance probability of 82.04%.

Table V compares the judges above the average score
on the attitude questionnaire (liberal); 75% (15/20) of the Democratic judges decided for the employee and 70% (7/10) of the Republican judges decided for the employee, which is a difference of .05. By holding constant liberalism, the difference between parties in deciding for the employee almost disappears. By using a partial correlation formula $\frac{r_1 - r_2 r_3}{\sqrt{(1-r_2^2)(1-r_3^2)}}$, where $r_1$ is the correlation coefficient of party to pro-employee, $r_2$ is the coefficient of liberalism to party, and $r_3$ is the coefficient of liberalism to pro-employee, one finds that the correlation coefficient of being a Democrat and deciding for the employee (while holding liberalism constant) is .0067876. This means that by holding constant liberalism, one cannot use the judge’s party to predict his decision in an employee injury case, since the relation is extremely low.

Whether this is a co-effects model ($x \rightarrow y$, $z \rightarrow x$, $z \rightarrow y$) or an intervening model ($x \rightarrow y$, $x \rightarrow z$, $z \rightarrow y$) depends on the temporal order of the variables. If $z$, acquiring liberal attitudes, precedes the $x$, joining a party, it is a co-effects model, since $z \rightarrow x$. If $x$, joining a party, precedes $z$, a liberal attitude, then it is an intervening model, since $x \rightarrow z$. A person develops his attitudes at a young age, probably before he is in elementary school, while one joins a party at a much later age. Thus, he would then choose a party that matches his attitudes. However, after a person affiliates with a party, the party and its members reinforces his attitudes, but to a lesser extent than attitudes affect party membership.
A person with liberal attitudes would choose the Democratic party, since it is considered to be the more liberal of the two parties, except in some areas like the South. Liberalism relates to pro-employee, because a liberal person would view the employee as the "underdog."

When one holds constant liberalism, the relation of pro-employee to Democratic judges almost totally disappears. This difference is so slight that it is probably not worthwhile to investigate. Other possible z variables, besides liberalism, could be social class or whether the judge was elected or appointed. These variables could account for some of the remaining difference.

There is also a reason why the relation of being Democratic and pro-employee is not higher than .1945. It is not stronger, since not all liberal judges are Democratic nor are all conservative judges Republican. For example, if one area is predominantly one party, the only way a judge may get slated and elected is if he belonged to the dominant party. Therefore, a conservative judge may join the Democratic party to get elected even if the party line is contrary to his beliefs.

The measuring of a judge as liberal or conservative is based on a scale that rates a judge with a score of 110 just as liberal as a judge with a much higher score, since they both have a score that is above the 109 average score. This
could explain why the correlation coefficient of liberalism to Democratic or to pro-employee is not higher.
SECTION II  OPTIMUM CHOICE WITHOUT PROBABILITIES

This section concerns excluding illegally seized evidence from criminal trials. The independent variables were the adoption of an exclusionary rule(exclus) to exclude illegally seized evidence and prosecution(prosecut) of the person who illegally seized the evidence. The prosecution variable was a combination of civil or criminal action. The dependent variables were adherence of police officials to the requirement for legal search and seizure(adher) and the morale of the police in making searches(morale). The exclusionary variable had a 0 if the state adopted the rule before the Mapp vs. Ohio decision or a 1 if the state adopted the rule after the court decision which required the exclusionary rule. Three states were left blank, since they contained elements of both. The prosecution variable consisted of asking officials if there was either no action(coded 1), some, five and under(coded 2), or more than five(coded 3) cases of prosecution against people who illegally seized evidence. This was done for both civil and criminal action. This variable of civil or criminal prosecution was collapsed into one variable labeled prosecution(prosecut). When collapsed the prosecution variable read either blank(no information), 1(no action), or 2(some action, either criminal or civil or a combination.
criminal action

<table>
<thead>
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<th>blank</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
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<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>civil</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>action</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

Adherence and morale was measured on a scale of one to five (one being lowest and five was highest) and this variable measured the adherence to the exclusionary rule and the morale of the police officials from 1960-1963.  

The regression analysis eliminated the cases that had a missing value for either the exclusionary, prosecution, adherence, or morale variable. Total deletion was used over pairwise deletion to obtain a constant sample size, since the regressions would be compared with each other.

\[ x_1 \text{ exclusion} \rightarrow +.130 \rightarrow \text{adherence } y_1 \]

\[ x_2 \text{ prosecution} \rightarrow -.022 \rightarrow \text{morale } y_2 \]

The most interesting regression was the prosecution to adherence, which was only +.004. One would tend to believe that prosecution of the offending officer is a more effective deterrent to prevent illegal seizure of evidence than would be excluding the evidence. The reason probably is that prosecution is not used very often. A prosecuting attorney is reluctant to prosecute police, since he has to work with them and does not want resentment between the police and himself. Individuals probably refrain from using civil suits,
since the suit would cause the complainants to suffer embarrassment, to spend money on lawyers, and to spend time on the case. The relation between prosecution and adherence is probably S shaped. With more utilization of prosecution

\[ \text{adherence} \]

\[ \text{prosecution} \]

there would be more adherence to the requirements of the legal seizure of evidence. The regressions involved in this project probably represent the lower end of this chart where there is little prosecution and little relation to adherence. However, if prosecution is used more, the relation to adherence would increase. This probably also explains the low regression coefficient (-.022) of prosecution to morale as compared to exclusion to morale (-.23). Since prosecution is seldom used, it may not affect the morale.

Through benefit-cost analysis, one can determine which policy to adopt. The benefit of the exclusionary rule is the increased police adherence (+.130), while the cost is a decrease in police morale (-.230). For the exclusionary rule, the benefit plus cost is 

\[ (+.130)w_1 + (-.230)w_2 \]

The \( w_1 \) is the weight or the importance of adherence and \( w_2 \) is the weight of police morale. For the prosecution, the benefit is increased adherence (+.004) and the cost is decreased police morale (-.022). Thus total
benefits is equal to \((+0.004)w_1 + (-0.022)w_2\). Again \(w_1\) is the weight of adherence and \(w_2\) is the weight of police morale.

<table>
<thead>
<tr>
<th></th>
<th>adherence((w_1=1))</th>
<th>morale((w_2=1))</th>
<th>total benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>exclusionary rule</td>
<td>+.130</td>
<td>-.230</td>
<td>-.10</td>
</tr>
<tr>
<td>prosecution</td>
<td>+.004</td>
<td>-.022</td>
<td>-.018</td>
</tr>
</tbody>
</table>

If adherence and morale were given a weight of one, the benefits of the exclusionary rule is -.10 and the benefits for prosecution is -.018. Thus, neither the exclusionary rule nor the prosecution policy should be implemented, since the total benefits are negative. If one of the two policies had to be adopted, the prosecution policy should be adopted, since it had the least negative benefit.

<table>
<thead>
<tr>
<th></th>
<th>adherence((w_1=2))</th>
<th>morale((w_2=1))</th>
<th>total benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>exclusionary rule</td>
<td>+.260</td>
<td>-.230</td>
<td>+.03</td>
</tr>
<tr>
<td>prosecution</td>
<td>+.008</td>
<td>-.022</td>
<td>-.014</td>
</tr>
</tbody>
</table>

If adherence was twice as important as morale, adherence was given a weight of 2 and morale a weight of 1. In this case, the exclusionary rule should be adopted, since its total benefits are positive and also greater than the benefits derived from the prosecution policy. The prosecution policy still has a negative benefit. Adherence would have to be given a weight of 6 and morale a weight of 1 before prosecution produces a positive benefit.

<table>
<thead>
<tr>
<th></th>
<th>adherence((w_1=6))</th>
<th>morale((w_2=1))</th>
<th>total benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>exclusionary rule</td>
<td>+.780</td>
<td>-.230</td>
<td>+.550</td>
</tr>
</tbody>
</table>

When adherence is weighted six times more than morale, then prosecution has a +.002 benefit, but the exclusionary rule
has a higher total benefit (+.55). In this case, the exclusionary rule should be adopted, since it produces more total benefits than the prosecution policy. However, if one has the resources, one could adopt both policies. One would have to determine the effects of having both policies, since if both policies are used together, it may affect the regression coefficients. One could develop an equation such as \( y = a + b_1 x_1 + b_2 x_2 + b_3 x_1 x_2 \) which could measure the effect of having both exclusion \((x_1)\) and prosecution \((x_2)\) and the effect of both interacting \((x_1 x_2)\).

If morale is given a weight larger than the weight of adherence, the total benefit will be negative, since the increased value of the negative coefficients would cancel out the benefits of adherence.
SECTION III OPTIMUM CHOICE WITH PROBABILITIES

This section consists of finding the threshold probability of guilty, which must be surpassed for a jurist to perceive that the expected value of convicting exceeds the expected value of acquitting. Also, a comparison was conducted of the threshold probability figure between the sex of the jurist, the case (murder or rape), and the type of instructions (no instructions or reasonable doubt) which were read to the jurist. Ten subjects were interviewed for this project. While the sample size is very small, the important aspect is the analysis and methodology.

A four-cell table was used and the jurist was asked which possibilities were dissatisfying. The most dissatisfying possibility was rated -100 and the jurist then had to rate the other dissatisfying possibility on a scale of 0 to -100. The jurist is then asked which possibilities were satisfying. The most satisfying possibility was rated at +100 and the jurist then had to rate the other satisfying possibility on a scale of 0 to +100

FOUR-CELL TABLE OF POSSIBILITIES

defendant is:

\[
\begin{array}{c|c|c}
\text{jury decides to:} & \text{acquit} & \text{convict} \\
\text{innocent} & + A, - B & - C, + D \\
\end{array}
\]
The value for A and D were positive, since a person is satisfied if an innocent defendant was acquitted or a guilty defendant was convicted. The value of B and C were negative, since a person is dissatisfied if a guilty defendant was acquitted or an innocent defendant was convicted.

The script had two variables. One half of the subjects were jurists hearing a rape case and the other half heard a murder case. Also, one half of the subjects received no instructions concerning the degree of guilt needed to convict. The other half were told that they should find the defendant innocent if there was even 5% belief that the defendant was innocent (the script is in Appendix I). In total, there were three variables; variable x, sex of the jurist; variable y, type of case; and variable z, type of instructions.

The formula to find the threshold probability figure \( P^* \) is:

\[
P^* = \frac{(A - C)}{(A - B - C + D)}.
\]

<table>
<thead>
<tr>
<th></th>
<th>( 1-P )</th>
<th>( P )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquit</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>Convict</td>
<td>C</td>
<td>D</td>
</tr>
</tbody>
</table>

\[
EV_A = A(1-P) + B(P) \\
EV_C = C(1-P) + D(P)
\]

To derive the formula, one computes the expected value of acquitting \( EV_A \) and the expected value of convicting \( EV_C \).

From the four-cell table, \( P \) means probability of guilt and \( 1-P \) means probability of innocence. For example, if \( P \) was .6 then six defendants out of ten are guilty. If six are guilty, then four would be innocent or \( 1-P \). The \( EV_A \) is equal to the probability of innocence \( (1-P) \) times the satisfaction score \( A \).
in cell 1 plus the probability of guilt(P) times the satisfaction score(B) in cell 2. Thus, \( EV_A = A(1-P) + B(P) \). The expected value of convicting is computed the same way; the value(C) in cell 3 times the probability of innocence(1-P) plus the value(D) in cell 4 times the probability of guilt(P). Thus, \( EV_C = C(1-P) + D(P) \). The threshold value(P*) is where \( EV_C = EV_A \), since an increase in \( EV_C \) or in \( EV_A \) would mean the defendant is convicted or acquitted. This happens because the expected value of one alternative outweighs the value of the other alternative. For example, if the \( EV_C \) is greater than the \( EV_A \), then the defendant is convicted. To find the threshold probability(P*), one would solve for the P in the equation \( EV_C = EV_A \) after substituting \( A(1-P) + B(P) \) for \( EV_A \) and substituting \( C(1-P) + D(P) \) for \( EV_C \).

\[
A(1-P) + B(P) = C(1-P) + D(P)
\]
\[
A - AP + BP = C - CP + DP
\]
\[
A - C = P(A - B - C + D)
\]
\[
P^* = A - C / (A - B - C + D)
\]

The calculations for the P* for the subjects, grouped according to variables or combination of variables, is in Appendix II. Also included is the difference of the P* between groups and the significance of the difference. These calculations were performed on a Dec 10 machine, but it would not produce any probability figures for mean P* scores in which two variables were held constant and one variable was manipulated. By holding constant two variables, the result was that one subject was compared to another. This
would result in a sample size too small for the t-test to determine the significance, since the degrees of freedom \((N_1+N_2-2)\) would be zero. Thus, the t-value would be undefined since 
\[ t = \frac{M_1 - M_2}{\sqrt{\frac{1}{N_1} + \frac{1}{N_2}} \cdot \frac{S^2}{N_1 + N_2 - 2}} \] 
would be equal to \(M_1 - M_2/0\), which is undefined, because the degrees of freedom are zero. Also, since the sample size was so small, the probability of the difference being due to chance could not be used to accept or reject a hypothesis. Instead, the significance figure was used to rank the various means.

After computing the mean probability figures and the significance of the difference, one finds that the sex of the jurist and the type of instructions provided had a lower chance probability than the type of case. However, in all three, the chance probability was over 50%. Females, on the average, had a higher threshold probability than did males. This could be explained if one assumes that females are typically housewives and stay at home, while men go out to work and meet more people and discuss the crime problem. Thus, the males would view crime as more important of a threat than would women. Murder cases involved a lower threshold than rape cases, because people perceive murder as a more serious crime and thus, are more likely to convict a defendant. The most interesting difference was that people who received instructions had a lower threshold (0.4680) than did people who received no instructions (0.4860). Perhaps the instructions, acquit if there is even 5% of doubt, lowered the threshold. For example, one would have to assume
that people would have voted to acquit even if there was less than five percent doubt. The difference could also be the result of the small sample size and one deviant score. For example, subject 8 had a threshold of .39 and was instructed. If one disregards the .39, the average for the instructed group is .4875, which is slightly higher than the .4860 for the uninstructed group. Another possibility is that the questionnaire may not have presented the instructions clearly.

Concerning instructions, different results were obtained by holding the crime variable constant. In comparing the rape-uninstructed (.52) to rape-instructed (.46), the rape-uninstructed had a higher threshold than rape-instructed with the difference being due to chance less than 30%. However, in crimes of murder, it was the opposite; the instructed (.48) had a higher threshold than the uninstructed (.4633) with a chance probability of less than 59%. If one wanted to raise the threshold and lower the number of people convicted, the judge should instruct the jury in a murder trial but he should provide no instructions in a rape trial.

Significance tests were computed comparing the thresholds when manipulating the sex and the case variables. The most interesting and contrasting analysis was obtained when the sex variable was held constant. For males, the average threshold for rape was .4733 and for murder, it was .4600 with the difference being due to chance of less than 84%. For females, the average for rape was .50 and for murder, it was .4767 with the difference being attributed to chance less
than 23%. Both sexes had a lower threshold for murder than rape probably, since murder is more serious than rape. The interesting point is women had a much larger threshold than men concerning rape (difference = .04), but the difference between sexes for murder is .0167. One would expect that the difference between murder would be small since murder has few sexual connotations. However, rape is a crime against women and one would expect that women would identify with the victim and be less likely to acquit the defendant. The results show that the women have a higher threshold than men. Perhaps a woman tries not to think about the possibility of rape and believes that the victim is different from herself or that the defendant led on the attacker. One should note that for all possibilities the women had a higher threshold probability than the men. According to this information, a defense lawyer should attempt to have women placed on the jury, since they have higher thresholds. However, in an actual courtroom and trial, the threshold possibilities may change, because of the formal setting.

In comparing the threshold probabilities between the sex of the jurist and the type of instructions, the resulting difference had an extremely high probability of being attributed to chance. The comparison of female-instructed (.4850) to male-instructed (.4567) was the least likely to be attributed to chance, but even this had a chance probability of .569. This difference can be attributed to the fact that, as explained above, the females had a higher
thresholds than males. When one compares females-uninstructed (.4867) to males-uninstructed (.4850), one finds a difference of .0017 and a probability of this difference being attributed to chance is 97.2%.

<table>
<thead>
<tr>
<th>Group 1</th>
<th>Group 2</th>
<th>M₁</th>
<th>M₂</th>
<th>Diff.</th>
<th>Probs(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>males</td>
<td>females</td>
<td>.4680</td>
<td>.4860</td>
<td>.018</td>
<td>53.2</td>
</tr>
<tr>
<td>males</td>
<td>females</td>
<td>.4733</td>
<td>.5000</td>
<td>.0267</td>
<td>67.1</td>
</tr>
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<td>rape</td>
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<td></td>
</tr>
<tr>
<td>males</td>
<td>females</td>
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<tr>
<td>males</td>
<td>females</td>
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<td>.4850</td>
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<td>.4867</td>
<td>.0017</td>
<td>94.0</td>
</tr>
</tbody>
</table>

One can use the above information to lessen the difference between the thresholds of male and female jurist. Females have a .018 higher threshold than males which is attributed to chance 54% of the time. When compared by cases, the females have a higher threshold in both rape and murder cases. If one instructs the jurist, the females still have a higher threshold than males with a difference of .0283 and a probability of 56.9%. However, when one does not instruct the jurist, there is little difference between the sexes. The difference is only .0017 which could occur by chance 97.2% of the time. While one would expect the directions to provide guidelines, which would result in a uniform threshold, the instructions affect the sexes differently. When compared to the uninstructed threshold, the instructions lowered the threshold for the males by
.0283(probability=66.6%), but for the women, the instructions lowered the threshold by only .0017(probability=94%). The instructions had little effect on females, but for the males, the instructions lowered their thresholds and widened the gap between the thresholds of males and females. Also, the chart shows that males-uninstructed and females-instructed have the same threshold(.4850). To eliminate the different thresholds between the sexes, one could leave the males uninstructed and only instruct the females. However, this seems kind of discriminatory and may offend some females, because it implies that they are not as intelligent as males and must be instructed. The next alternative would be to not instruct the females and males, since this makes the difference between the thresholds among males and females almost negligible.

There are other variables which could have been used. A couple that seem important are liberalism, age of the jurist, and the age, race, and sex of the defendant. Also interesting is that 60% of those interviewed thought that acquitting the guilty was a more serious error than convicting an innocent defendant. This may imply that some people favor protecting society from possible criminals(by convicting them) as opposed to a more individualistic outlook that seeks to protect an individual from wrongful conviction.
SECTION IV OPTIMUM MIX

The information for this exercise consists of the number of participants each office handled, the total cost of each office, the satisfaction score (from 1 to 12; lowest to highest), and the percent of the funds spent on law reform. There were originally 16 offices in the study, but one was dropped because it was a deviant case. (The average spent by the 15 offices was $47.50 per participant, but the deviant office spent over $250.)

The raw data was transformed to show the amount of money spent for law reform per participant and the amount of money spent for routine casework per participant:

\[
\begin{align*}
\text{DOLLAW} &= \text{dollars spent per person for law reform} \\
\text{DOLLCASE} &= \text{dollars spent per person for routine casework} \\
\text{LAWREF} &= \text{percent of total cost spent for law reform} \\
1.00-\text{LAWREF} &= \text{percent of total cost spent for routine casework} \\
\text{TOTALC/PART} &= \text{total cost divided by number of participants} \\
\text{DOLLAW} &= \text{LAWREF} \times (\text{TOTALC/PART}) \\
\text{DOLLCASE} &= (1.00-\text{LAWREF}) \times (\text{TOTALC/PART}).
\end{align*}
\]

For nonlinear analysis the satisfaction, dolllow, and dollcase variables were transformed to \( \log_{10} \):

\[
\begin{align*}
\text{LGDOLLAW} &= \log_{10} (\text{DOLLAW}) \\
\text{LGDOLLCASE} &= \log_{10} (\text{DOLLCASE}) \\
\text{LGSAF} &= \log_{10} (\text{SATIS}).
\end{align*}
\]

Regression analysis was performed with satisfaction (SATIS) being the dependant variable and dollars spent for law reform per person (DOLLAW) and dollars spent for routine
casework (DOLLCASE) being the independent variable. The result was the equation \( S = 7.16 + .42L - .06C \), with \( S \) being satisfaction, \( L \) being DOLLAW and \( C \) being DOLLCASE. Regression was performed with \( \log_{10} \) of satisfaction being the dependent variable and \( \log_{10} \) of dollars for law reform per person and \( \log_{10} \) of dollars spent for routine casework. The result was \( \log_{10} S = 1.11443 + .52 \log_{10}(L) - .41 \log_{10}(C) \) which is a nonlinear equation, \( S = 13(L)^{.52}(C)^{-.41} \).

The reason for a regression coefficient for law reform being greater than the regression coefficient for routine casework centers around the evaluators. The evaluators from the firm were generally conservative-oriented, since President Nixon, who was critical at the OEO Legal Services, hired the firm. The evaluators, even though being conservative, were impressed with the law reform activities. Even though the evaluators may have disliked the results of the law reform activities, they were impressed by the fact that the lawyers could reform the laws. The evaluators admired lawyers who could present briefs and arguments before an appellate or supreme court and win the case. On the opposite side, they found nothing impressive about lawyers doing routine casework. If the evaluators had been poor people, they probably would have been more satisfied with routine casework, because it would seem more relevant to their situation than would law reform activities.

Another important issue is the reason for the coefficient of \( C \) being negative. One answer is that present satisfaction has a relation with satisfaction in the past.
Specifically if a person is not satisfied with the agency in the past, he probably will not be too satisfied with the agency at the present, since it is hard to eliminate past impressions. This relationship is expressed by: \( S_{t-1} \rightarrow S_t \). Also being dissatisfied with the system in the past would influence a person to recommend more funds for the future (i.e., allocating more money for casework). The equation for this is \( S_{t-1} \rightarrow \$C \). Putting additional funds into the system will not change the satisfaction since it is related to past satisfaction.

The result is that while funds increase, the satisfaction does not change.

Another explanation is that satisfaction is related to the achievement of goals. Setting goals leads to a demand for more money and more funds. It also has a positive relation to raising the goals. This relationship is expressed by: Goals \( \rightarrow \$C \). However, as one raises his goals, it is harder to achieve the goal. Thus, goals have a negative relation to satisfaction, because a person becomes dissatisfied if he can not achieve his goals. This relationship is expressed by: Goals \( \rightarrow \) Satisfaction.
The result is a negative relation between funds for casework and satisfaction.

The next step is to find the optimal allocation of funds to law reform and to casework. As a base figure, the average agency spent $47.50 per participant. Also, the Legal Service set some constraints: at least 10% of the funds should be spent on law reform issues and at least 60% should be spent on routine casework. The result is the average agency has a minimum constraint of spending at least $4.75 (47.50 \times .10)$ on law reform cases, a maximum constraint of $19.00 (47.50 \times [1-.60])$ on law reform, a minimum constraint of $28.50 (47.50 \times .60)$ for casework, and a maximum of $42.75 (47.50 \times [1-.90])$ for casework. The upper limit on spending per person is $47.50 which is the present average and the minimum that can be spent is $33.25, which is the sum of the minimum for law reform and casework dollars. Also two other constraints are that satisfaction cannot be greater than 12 since the scale only goes to 12 and $S$ should also be greater than or equal to 7, since the evaluators refer to 7 as a point where an office is operating efficiently. The feasible range is shaded on the graph (Appendix III).

The first goal, in linear analysis, is to maximize $S$ but stay within the cost restraints and also minimize $TC$; the second goal is to minimize $TC = L + C$ but provide at least an $S$ of 7. From the equation $S = 7.16 + .42L - .06C$, one would get the most out of a dollar by allocating it to law reform, because the coefficient of $L$ is greater than the
coefficient of C. As a matter of fact one would want to give only the minimum to C because the coefficient of C is negative which means that by giving more money to C the satisfaction decreases. The general rule is to allocate the minimum to both variables and then allocate the rest of the money to the variable with the largest coefficient greater than zero. If one allocates $28.50 to C and the maximum to L (19.00), the result is an S greater than 12. Since this is impossible (the scale only goes to 12), one sets the equation equal to 12 and the minimum to C and solve for L, 12 = 7.16 + .42L - .06($28.50). The result is L = $15.59. With L + $15.59 and C = $28.50 one receives an S of 12 (approximately due to rounding the decimals the actual S may be less than 12 by some tenths). There are other combinations of L and C which would result in an S of 12, but they either lie outside of the constraints or involve allocating more money to C and L which is inefficient. An L of $15.59 and a C of $28.50 is the minimum TC which results in an S of 12.

The next step is to minimize total cost but provide an S of at least 7. From the first goal one notices that by allocating the maximum to L and the minimum to C (due to the negative coefficient) the S will be greater than 7. If we set the S equal to 7 and C equal to $28.50, the result is an L of $3.69 which is less than the minimum constraint for L ($4.75). If we then set L and C equal to the minimum: .42($4.75) - .06($28.50) + 7.16 = 7.45. Satisfaction is equal to 7.45 when the minimum is allocated to L and C.
<table>
<thead>
<tr>
<th>L</th>
<th>C</th>
<th>TC</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.75</td>
<td>28.50</td>
<td>33.24</td>
<td>7.45</td>
</tr>
<tr>
<td>15.59</td>
<td>28.50</td>
<td>44.09</td>
<td>12.00</td>
</tr>
<tr>
<td>8.28</td>
<td>39.22</td>
<td>47.50</td>
<td>8.2</td>
</tr>
</tbody>
</table>

When comparing the average being presently spent, one notices that by a more efficient allocation of resources, one can increase satisfaction by 3.8 points and cut costs by $3.41.

The next step is to decide the optimal allocation for the nonlinear equation. The nonlinear equation maybe more representative, because the standard error (.10965) is less than the standard error for the linear equation (2.40783). The nonlinear equation is $S = 13(L)^{.52}(C)^{-0.41}$ (Appendix IV for the graph). Satisfaction decreases if more money is allocated to C, since the exponent of C is negative. Because of the exponent, solving for the optimal solutions requires the same steps used to derive the linear solutions.

To maximize S, one would allocate the minimum to C ($28.50) and the rest to L ($19.00) since the exponent of L is positive and greater than C. The result is an S of greater than 12. Since the allocation of the whole $47.50 results in a too large S, one sets C equal to $28.50 and S equal to 12 and solve for $L = 13(L)^{.52}$$($28.50$)^{-0.42}$. L is equal to $12.03$. This is also the minimum total cost to have an S of 12, since if one allocates more to C, S drops in value due to the negative exponent and to counter this, one would allocate more to L which raises TC. If one gave more funds to L, S would be greater than 12.

A general rule for an equation that does not have a negative exponent involves solving the slope equalization
equation and the total cost equation. For an equation in
the form \( y = a x_1^{b_1} x_2^{b_2} \) the slope equalization formula is
\( a b_1 x_2^{b_2} x_1^{b_1-1} = a b_2 x_1^{b_1} x_2^{b_2-1} \); then express \( x_2 \) in terms of
\( x_1 \) and then insert that value in place of \( x_2 \) in the total
cost equation (\( TC = x_1 + x_2 \)). Once \( x_1 \) is found, the \( x_2 \)
value can be found by inserting the \( x_1 \) value into the Total
Cost curve and solve for \( x_2 \). One can insert the \( x_1 \) and \( x_2 \)
values into the \( y = a x_1^{b_1} x_2^{b_2} \) equation to find \( y \). To find
the minimum cost for that \( y \) value, one then solves simul-
taneously the slope equalization equation and the goal
equation \( Y = a x_1^{b_1} x_2^{b_2} \).

The next problem is to find the minimum total cost
and still provide a satisfaction of 7. Again since the \( C \)
exponent is negative, one can solve the equation the same
way as in linear analysis. Since allocating the maximum
to \( L \) and the minimum to \( C \) results in an \( S \) of greater than 7.
Next set \( S = 7 \) and \( C = \$28.50 \) (one always wants the minimum
for \( C \) since the exponent is negative), then solve for \( L \).
The result is \( L \) is equal to \( \$4.27 \) which is less than the
minimum of \( \$4.75 \) which must be allocated for law reform.
Inserting the minimum values for \( L \) and \( C \)
\( (13(\$4.75)^{.52}(\$28.50)^{-.41} \)
and satisfaction is equal to 7.40. One can minimize the cost
of \( \$33.25 \), still be within the constraints and provide at
least an \( S \) of 7.

<table>
<thead>
<tr>
<th>L</th>
<th>C</th>
<th>TC</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.75</td>
<td>23.50</td>
<td>33.25</td>
<td>7.40</td>
</tr>
<tr>
<td>12.03</td>
<td>28.50</td>
<td>40.53</td>
<td>12</td>
</tr>
<tr>
<td>8.28</td>
<td>39.22</td>
<td>47.50</td>
<td>8.2</td>
</tr>
</tbody>
</table>
One notices that by allocating resources more efficiently, the agency could raise $S$ by 3.8 points and lower costs by $6.97. Also, as in both linear and nonlinear, the legal services are presently allocating funds inefficiently, because they are using $39.22 for routine case handling when the most efficient mix is to allocate the minimum, $28.50, to C. This exercise demonstrates that by using linear or nonlinear analysis, one can efficiently allocate scarce resources to receive the maximum benefit.

**LINEAR PROGRAMMING**

There are computer packages available to find the optimal mix for linear equations. This basically involves maximizing or minimizing an equation within certain constraints.

For Exercise IV the following equations or inequalities were used.

\[ S = 7.14 + .42L - .06C \]
\[ 7 \leq S \leq 12 \text{ or } 7 \leq 7.14 + .42L - .06C \leq 12 \]
\[ $4.75 \leq L \leq $19.00 \]
\[ $28.50 \leq C \leq $42.75 \]
\[ $33.25 \leq L + C \leq $47.50 \]
\[ TC = L + C \]

The reasons for these constraints were explained at the beginning.

The first program was to maximize $S$ subject to the above constraints. To maximize $S$, the equation $7.14 + .42L - .06C$ which is equal to $S$ was maximized. I removed the constant, 7.14, by subtracting it from the equation and subtracting it from the $S$ constraints. The result was to maximize $.42L - .06C$ and $-.16 \leq .42L - .06C \leq 4.48$. 
The input read:

<table>
<thead>
<tr>
<th></th>
<th>L</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max</td>
<td>.42</td>
<td>-.06</td>
</tr>
<tr>
<td>Con. 1</td>
<td>-.42</td>
<td>.06</td>
</tr>
<tr>
<td>Con. 2</td>
<td>.42</td>
<td>-.06</td>
</tr>
<tr>
<td>Con. 3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Con. 4</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Con. 5</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Con. 6</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Con. 7</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Con. 8</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

The constraints bounded the feasible region shaded on the graph.

Con. 1 which was originally .42L -.06C -.16 was multiplied by -1, since one cannot have a negative value on the left.

Multiplying by -1 also resulted in changing the greater than or equal to sign to less than or equal to. The result was that the maximum of .42L -.06C was 4.84 which is equal to .42L -.06C + 7.16 = 12.00. The maximum S is 12. The mix of L and C to arrive at 12 was L = 15.59 (it is actually 15.5952, but if it was rounded up S would be greater than 12) and C = 28.50.

To insure that the L and C figures would be the minimum total cost to result in an S of 12, a second program was ran. This program was basically the same as the first one except the equation minimized was L + C(1,1) and a ninth constraint of .42L -.06C = 4.84 was added to insure that S would be equal to 12. The result was a minimum TC of 44.09 (rounded down from 44.0952) and an L = 15.59 (actually 15.5952) and C = 28.50. If one would want to check the figures, one could solve the two equations, L + C = 44.0952 and .42L -.06C = 4.84, simultaneously to find L and C. L + C = 44.0952 is the minimum total cost in providing an
S of 12 and .42L - .06C = 4.84 provides an S of 12. By solving the two equations simultaneously, one finds the intersection of these two lines and the one finds the value for L and C.

A second linear program found the minimum L + C that could be used and still provide for at least a 7 for satisfaction. The input was:

```
   L   C   LE
Min. 1 1 LE
Con. 1 -.42 .06 LE .16
Con. 2 .42 -.06 GE 4.84
Con. 3 1 0 GE 4.75
Con. 4 1 0 LE 19.00
Con. 5 0 1 GE 28.50
Con. 6 0 1 LE 42.75
Con. 7 1 1 GE 33.25
Con. 8 1 1 LE 47.50
```

The output was that the minimum L + C was 33.25 with L = 4.75 and C = 28.50 and S is greater than or equal 7. One could tell immediately that the best combination of L + C = 33.25 was L = 4.75 and C = 28.50, since the constraints allowed the lowest level of L = 4.75 and C = 28.50. After putting L = 4.75 and C = 28.50 into S = 7.16 + .48L - .06C, satisfaction was equal to 7.45.

The linear programming routine is an easy way and a quick way to find the optimal allocation of funds. Using a computer is especially helpful, if one has numerous variables and constraints.
SECTION V OPTIMUM LEVEL ANALYSIS

This project involved finding an optimum percentage of defendants to hold on the basis of minimizing costs. Using seven variables: 1) the number of defendants held in jail pending trial, 2) the number of defendants released, 3) the jail costs per day per inmate, 4) the average number of days each inmate was held, 5) the percent of defendants held in jail who were not subsequently found guilty, 6) the percent of defendants released who failed to show up in court, and 7) the percent of released defendants who were arrested for committing another crime while released, the various costs were derived. Three holding costs were calculated on a per defendant basis:

1) total jail costs
2) total lost national income cost figured at an average monthly wage of $360 and
3) total bitterness costs for the defendants found not guilty figured at $300 per month (bitterness costs are less than the lost income, since the defendant is partially satisfied being found not guilty.

Two releasing costs were calculated:
1) total rearrest cost calculated at an average rearrest cost of $200 for each defendant failing to show up and
2) total crime committing costs calculated at an average cost of $1000 for each defendant who committed a crime while released.

Using nonlinear regression analysis, the equation for total holding costs is \( THC = 1185(\%H)^{1.31} \) and total releasing costs is \( TRC = 77(\%H)^{-0.17} \). The total cost is found by adding THC and TRC(TC = 1185(\%Held)^{1.31} + 77(\%Held)^{-0.17}). \)
Graphically, TC is equal to the distance from the horizontal axis to the THC curve plus the distance from the horizontal axis to the TRC. Nonlinear analysis was used instead of linear analysis for a couple of reasons. Concerning THC, one would expect that as the percent held rises and approaches 100%, the last defendants to be held are likely to have steady, good-paying jobs, are the ones most likely to be acquitted and would be the most bitter, and would probably be the most difficult to handle in prison, since they would resent being treated like low-risk defendants. TRC will rise quickly as the percent of defendants held approach zero, since the worst risk defendants will be released and they are the ones most likely not to show up and will probably commit a crime will released. Also, if one used linear equations and added them together for a total cost equation, it would be a straight line and depending on the slope of the line, the optimum number to hold would be either 0 of 100%. This is contrary to the idea that the optimum percent to hold is somewhere between 0 and 100%. Thus, linear analysis ignores the convex nature of the THC and TRC curves.

The equation concerning total cost is $TC = 1185(\%H)^{1.31} + 77(\%H)^{-0.17}$. The graph for the curves looks something as follows (Appendix V for actual graph).
From the graphs produced by the plotter, one can tell the optimum level to hold is between .028 and .046. The optimum point is the lowest point on the total cost curve. To find this point, one takes the total cost curve \( TC = a_1x^{b1} + a_2x^{b2} \), derive the first derivative \( (b_1a_1x^{b1-1} + b_2a_2x^{b2-1}) \), and let the derivative equal to zero, then solve for \( x \). In this case, the equation is \( 1185(\%H)^{1.31} + 77(\%H)^{-1.17} \), the derivative is \( 1552.35(\%H)^{3.31} - 13.09(\%H)^{-1.17} \). Setting this equation equal to zero and solving for \( \%H \), one finds the optimum \( \%H \) is approximately 4%.

The actual average is 27%. For the TC curve to bottom out at 27%, either or both of the THC and TRC curves would have to change. For example, if the THC curve exponent was less than 1.31, the THC curve would still be anchored at the left end point, but the THC curve would not rise as rapidly and thus, the TC curve would bottom out at a point greater than 4%. If the TRC curve was anchored at the right endpoint and the TRC curve rises more rapidly, the TC curve would bottom out at a point greater than 4%.

The reason for the discrepancy could be account for by several possible errors. Some holding costs may have been excluded such as prison riots, cost of convicting innocent defendants, and damage to the family. A releasing cost excluded was the use of pretrial detention as punishment. Judges may have different values for the loss of income, likeliness of failures to show-up, and likeliness of committing a crime while released. With a holding rate of 27%, total cost
is equal to $500.58 (THC per defendant is $375.70 and TRC is $125.17), but with a holding rate of 4%, total cost is $150.55 (THC per defendant is $17.47 and TRC is $133.08). By lowering the percent held, total cost is decreased by $358.23 and TRC only rises by $7.91.

If one would want to lower the percent held, one could use a point system which would give points to a defendant for certain characteristics. A cutoff could be determined in which 96% of the defendants are released and only 4% are held. The ones held would be the defendants that have characteristics that make them high-risk defendants.

CAUSAL ANALYSIS

In this section, there are four variables, %H, TRC, THC, and TC. The regression coefficients were derived by using the log of the above variables.

The first analysis states that the relation between THC and TRC is the result of the effects of the variables %H and TC. This is the effects model.

As the %H rises, THC also rises, since the THC relies on the number held, the more defendants held the higher the costs.
The relation between \( \%H \) and TRC is negative, since the more defendants held, the less releasing costs there are. In both relations, the percent held proceeds the THC and TRC; also, THC and TRC are the results of the \( \%H \). In the other diagram, TC has a positive relation with THC, since if TC can rise, one can incur more holding costs. With the other variable, if TC can rise, then one can incur more TRC. One should view the process as allowing only so much total costs and then the system allocates the total cost between holding and releasing costs.

We know that \( r_1 = +.63 \), \( r_3 = -.17 \), \( r_4 = +.08 \), \( r_5 = +.93 \), and \( r_6 = +.40 \). Also the predicted \( r_4 \) is equal to \( r_1 r_3 + r_5 r_6 \). The predicted \( r_4 \) is then equal to +.1749. The actual \( r_4 \) is .08; the difference between predicted and actual is .0949.

The other analysis relates \( \%H \) to TC and uses the variables THC and TRC as intervening variables.

As more defendants are held, the holding costs also rise (since THC is a function of \( \%H \)). As the THC rises, then TC also rises, since TC is a function of THC. As the \( \%H \) rises, the releasing cost decreases, since the less people released the less releasing costs will result. There is a positive relation between TRC and TC, since as TRC decreases, TC also decreases, because TC is a function of TRC and THC. The percent held variable precedes the THC and TRC variables. In the first analysis, TC was determined first and then distributed
between THC and TRC. In this analysis, THC and TRC are
determined first by percent held and TC is dependent on
TRC and THC.

Again $r_1 = +.63$, $r_2 = +.526$, $r_3 = -.17$, $r_5 = +.93$,
and $r_6 = +.40$. Also, we can predict $r_2$ by adding the products
of $r_1 r_5$ and $r_3 r_6$. Predicted $r_2$ is equal to .5179. From
the regression analysis the actual $r_2$ is .526. The difference
between the actual and the predicted is .0081.

The second analysis, using THC and TRC as intervening
variables, has a difference between actual and predicted of
.0081, while the analysis using %H and TC as variables that
coefficient the relation between THC and TRC had a difference
between actual and predicted of .0949. The intervening
model fits the actual results better than the coefficients model.
APPENDIX I

I am conducting a survey concerning your feelings about some possible court decisions, if you were serving on a jury. Your answers will be kept confidential.

You are serving on a jury in a trial where the defendant is accused of (state one: murder = 0 or rape = 1).

State one: The judges instructs you that if there is any reasonable doubt in your mind that the defendant is innocent, even if there is only 5% belief in your mind that he is innocent, you should vote to acquit the defendant. = 0 or

The judge instructs you to acquit or convict the defendant. = 1.

If you acquit the defendant, he may be innocent(A) or guilty(B). If you convict the defendant, he may be innocent(C) or guilty(D).

Of these four possibilities, which ones would you give you some dissatisfaction? (Should be B and C)

Which of the dissatisfying possibilities gives you the most dissatisfaction? We will score that possibility as a -100. On a scale of -100 to 0 with -100 being the most dissatisfying score and 0 being indifferent, what would you score the other dissatisfying possibility? Are you sure that you want this score as close to or as far away from the most dissatisfying possibility? If not, you can change the score.
Of the four possibilities, which would give you some satisfaction? (Should be A and D)

Which of the satisfying possibilities gives you the most satisfaction? We will score that possibility as +100. On a scale of +100 to 0 with +100 being the most satisfying score and 0 being indifferent, what would you score the other satisfying possibility? Are you sure that you want this score as close to or as far away from the most satisfying possibility? If not, you can change the score.

Thank you.
APPENDIX II

Means and Probabilities

1) Female(Number=5) = .4860
   Males(5) = .4680
   Difference = .018 Probability = .532

2) Murder(5) = .4700
   Rape(5) = .4840
   Difference = .0140 Probability = .629

3) Instruct(5) = .4680
   No Instruct(5) = .4600
   Difference = .0080 Probability = .564

4) Female-rape(2) = .5000
   Male-rape(3) = .4733
   Difference = .0267 Probability = .671

5) Female-murder(3) = .4767
   Male-murder(2) = .4600
   Difference = .0167 Probability = .584

6) Female-rape(2) = .5000
   Females-murder(3) = .4767
   Difference = .0233 Probability = .230

7) Male-rape = .4733
   Male-murder = .4600
   Difference = .0133 Probability = .841

8) Murder-instruct = .4800
    murder-uninstruct = .4633
    Difference = .0167 Probability = .584
10) Rape-instruct = .4600  
   Rape-uninstruct = .5200  
   Difference = .0600 Probability = .298
11) Murder-instruct = .4800  
    Rape-instruct = .4600  
    Difference = .0200 Probability = .6934
12) Murder-uninstruct = .4633  
    Rape-uninstruct = .5200  
    Difference = .0567 Probability = .157
13) Female-instruct = .4850  
    Female-uninstruct = .4867  
    Difference = .0017 Probability = .940
14) Male-instruct = .4567  
    Male-uninstruct = .4850  
    Difference = .0283 Probability = .660
15) Female-instruct = .4850  
    Male-instruct = .4567  
    Difference = .0283 Probability = .569
16) Female uninstruct = .4867  
    Male-uninstruct = .4850  
    Difference = .0017 Probability = .972
Appendix II

Feasible Region

\[ 12 = 7.76 + 1.92L - 0.06C \]

\[ 7 = 7.16 + 2.92L - 0.76C \]

\[ L = 33.25 \]
% H

TC = Total Cost
HC = Holding Cost
AC = Releasing Cost
FOOTNOTES

1 The data consisted of information pertaining to 62 state supreme court judges in 1955. The Directory of American Judges provided the background information (party affiliation) of the judges. Their decision propensities were formulated from the state court decisions. Their off-the-bench attitudes were obtained from a mailed questionnaire.

2 The data consisted of information from questionnaire respondents from 113 communities polled in 1963. Respondents were police chiefs, prosecutors, judges, defense attorneys, and ACLU officials. They were questioned about the effects of excluding illegally seized evidence from criminal proceedings.

3 The data consisted of information from the 16 legal services agencies which was compiled by the Kettelle Corporation.

4 The data consisted of information from 23 cities and was obtained through mailed questionnaires, completed by the 23 cities, which concerned their system of holding defendants awaiting trial.