Entitlements, Rights, and Fairness:
Some Experimental Results*

by

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Comments are invited.

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Economic and game theoretic models generally assume that when agents are assigned carefully specified property entitlements to economic resources they make individually rational economic decisions given those property entitlements. That is, in dealing with other economic agents they do not engage in trades or strike bargains which leave them worse off with respect to their own bundles of economic resources than if they had simply not traded or reached a bargaining agreement. In particular they do not give away their claims to resources unless they get some commensurate reward in return. Altruism may exist, but it is generally ignored in economic and game theoretic modelling.

Many psychologists, on the other hand, argue from theory and experimental evidence that a norm favoring equality or payment according to need is so strong that people only deviate from it under certain circumstances. Equity theory, which argues (also from theory and experimental evidence) that people allocate payments so as to equalize individual ratios between payments and intrinsic inputs, occupies a middle ground between payment by property rights and equal payment. The intrinsic inputs commonly include difficulty of the work, the time spent, the amount of work completed, and salient personal characteristics such as intelligence, family name, or social status. “Payments” include both benefits and harms produced by the experimental situation. This equal payment notion in equity theory apparently exerts a strong influence on subject behavior; experimental subjects who are paid more than equal co-workers give some of their payoffs to the lower paid co-workers, thereby restoring an equitable ratio of payments to inputs.

Legal theorists are also interested in property entitlements and moral rules for allocating payments. First, there is a large group of scholars of jurisprudence who believe that the law should (or does) reflect widely held
moral norms, and the law of property is no exception to this general rule. Of course, these norms may be a product of nature or produced by socialization processes. Sociobiologists argue that a mechanism of natural selection provides survival advantages to those who hold certain moral beliefs. Others argue that beliefs about morality are produced by the socialization process.

Second, regardless of the source of an individual's beliefs about morality, they may determine his behavior; a legal scholar who is interested in sound social policy must understand the relationship between moral theory and behavior to formulate sound policy prescriptions.

The research reported in this paper developed from the results of one part of a previous experimental study by the authors in which subjects appeared to allocate rewards more in accord with psychological equity theory than with non-altruistic individual rationality. In that experiment two subjects who had opposing payoff functions and who had full information of one another's payoffs struck two bargains with one another. By a flip of a coin one subject was allocated the power to choose a noncooperative outcome, unilaterally. That person could simply choose an outcome which gave him $12 and left the other subject nothing, regardless of whether or not the other subject agreed. However, if the two subjects cooperated with each other, they could obtain $14 from the experimenter, and the $14 could be split between the two subjects in any mutually agreed upon manner. Cooperative game theory predicts that subjects will cooperate and divide the rewards $13.00 - $1.00 (the Nash equilibrium). Under no circumstances will the winner of the coin flip settle for less than $12, according to game theory. However, in our experiments we observed all of the subject pairs choose the joint profit-maximizing outcome and divide the rewards $7-$7. In other words, the winner of the coin flip agreed to take $5 less than the $12 that he could get without the other subject's cooperation.
At first glance these results appear to the economist to be either altruistic or irrational. We hypothesized, however, that flipping a coin was not considered a just way of allocating property rights. Subjects perceived no morally justified difference between themselves, even though one "legally" owned a substantial property entitlement and the other did not. Thus, since they were equal, an equal split was the only fair allocation. We hypothesized that if we could make the subjects believe that they held morally justifiable property entitlements, either by letting them "earn" their unequal property entitlements, or by directly suggesting to them that their entitlements were, in fact, morally justified rights, they would treat the entitlements in a more individually rational fashion.

This paper reports the results of a set of experiments designed to test our hypothesis about subjects’ attitudes towards the connection between methods of allocating property entitlements and the fairness (or justice) of regarding those entitlements as rights. We generate testable hypotheses by making a theoretical connection of the following sort: if a subject holds a particular theory of fairness about entitlements and rights, then he will tend to act in certain ways. For example, the economic theory of fairness posits that there is no connection between the method of allocating entitlements and the fairness of treating those entitlements as rights; it is always fair to treat entitlements as rights. An extreme version of the psychological equal sharing theory also borders on denying the connection between the methods of allocation of entitlements and the fairness of treating those entitlements as rights: it suggests that people believe that one may never treat entitlements as rights. Equity theory suggests that people see some connection between methods of distributing entitlements and rights. Of course, depending on the particular theory of the connection between methods of allocation and
rights, a subject may be led to behave in different manners.

Each of the experiments reported in this paper allocated entitlements in a different manner, and then allowed subjects to divide the value of the entitlements. The results suggest that subjects behaved in accord with neither the economic theory nor the extreme version of psychological sharing theory, but rather in accord with a few theories of fairness in property, which resemble equity theory, and which will be detailed later in this paper. In particular, these experimental results show strongly that different methods of assigning property entitlements do lead to significant differences in the frequency of individually rational vs. equal payoff allocations. Allocations are almost all individually rational when subjects both have to win a game to be assigned a property entitlement and are told that they have earned the entitlement. Outcomes continue to maximize joint profits.

11. Experimental Design

A. General

All the experiments involved two people who were fully informed about one another’s payoffs. Bargaining was face-to-face and public and involved more money than most students can earn for an hour’s work in their next best alternative employment. Side payments were allowed; contracts were in writing and strictly enforced. All payments were made in public. Subjects were given no motivational instructions: they were not told what their objectives should be in choosing a number or in forming contracts.

B. Experimental Instructions

I. Game-trigger, Moral Authority Experiments

As the subjects arrived at a designated room they were randomly assigned the letters A or B. Each pair was placed in a separate room, with a monitor being the only other person present. The monitor provided the following set
of instructions to the subjects, who first read the instructions silently and then listened to the monitor read them aloud.

**General**

You are about to participate in an experiment in decision-making. The purpose of the experiment is to gain insight into certain features of complex economic processes. If you follow the instructions carefully, you might earn a considerable amount of money. You will be paid in cash at the end of the experiment.

**Specific Instructions to Participants**

You are person A. The other participant is person B.

This experiment requires that two decisions be made. Each decision will involve choosing a number. The number chosen will correspond to an actual dollar amount which will be paid to you at the end of this experiment. The number and corresponding payoffs for the first decision are on page five of these instructions; the number and payoffs for the second decision are on page six.

Pages five and six list not only the value of each number to you (under column ___), but also the value of each number to the other participant (under column ___).

Before each decision, both participants A and B will play a game. Whoever wins this game earns the right to be designated "controller" for that decision. The rules of this preliminary game are as follows.

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Above here is a picture of 17 vertical hash marks. Each player must, on each turn, cross out 1, 2, 3, or 4 hash marks. After a player has crossed out as many hash marks as he or she
wishes, it is the other player's turn to cross out 1, 2, 3, or 4
hash marks. The game continues until all hash marks have been
crossed out. The person who crosses out the last hash mark
loses the game. A will go first on the first decision, B will
go first on the second decision.

Example: A goes first and crosses out 4 marks

```
+-+-+-+-+-+-+-+
```

Then B crosses out 4 marks

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+-+-+-+-+-+-+-+
```

Then A crosses out 4 marks

```
+-+-+-+-+-+-+-+
```

Then B crosses out 4 marks

```
+-+-+-+-+-+-+-+
```

A must cross out the last mark on his turn, so A loses
the game, and B has earned the position of the controller.

If you win the game and are designated controller, you may,
if you wish, choose any number you like by filling out the form
on page seven and giving it to the monitor. However, if you
lose the preliminary game and are not designated controller, you
may still attempt to influence the controller to form a joint
agreement and choose some other number. In order to induc-. the
controller to reach an acceptable joint agreement, you may offer
to pay part of your earnings to the controller.

Example: Assume that A wins the preliminary game and earns
the position of controller for the first decision. Assume also
the following payoffs for A and B.
<table>
<thead>
<tr>
<th>Number</th>
<th>A's Payoff</th>
<th>B's Payoff</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$4</td>
<td>$1</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

Once A has become controller, he or she may choose number 2 without consulting B. However, B may attempt to persuade A to join in a joint decision to choose another number and/or division of payoffs. If a joint agreement is reached both parties must sign the agreement form on page seven, stating both what the chosen number will be and how much money will be transferred from one participant's earnings to the other's. For example, A and B might sign the agreement form on page seven choosing number 3 and directing that $2.00 be paid from B to A. Once the agreement form is signed the monitor will note that for this decision A is to be paid $5.00 at the end of the experiment, representing the $3.00 original payoff for the number 3 plus the $2.00 transferred from B, and that B is to be paid $3.00, representing the $5.00 original payoff less the $2.00 transferred to A.

The monitor can only enforce written decisions recorded on the form set out on page seven. You are, however, free to make any other sort of informal agreement that you wish.

No physical threats are allowed. If any party makes a physical threat, the threatened party will get his or her maximum payoff and the threatening party will get nothing.

Are there any questions? We ask you to answer the questions on the attached sheet to make sure you understand the instructions.
QUESTIONS
(Refer to your payoffs on page 5)

1. Number ____ makes me the most money. Number ____ makes me the least money.

2. If I become controller, I can make $____ even if the other person doesn't agree.

3. If A and B reach a joint decision to choose number 4 and B pays A $2.00, I make $____.

4. If I am the controller, I may choose the number which corresponds to my maximum payoff without making a joint agreement with the other participant, true or false? ____

5. Which of the following do you prefer? ____
   a. $1.50 for sure.
   b. A fair coin toss which pays $0 for heads and $11 for tails.

Payoff Sheet

Decision # _______

<table>
<thead>
<tr>
<th>Number</th>
<th>A's Payoff</th>
<th>B's Payoff</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$0.00</td>
<td>$12.00</td>
</tr>
<tr>
<td>2</td>
<td>4.00</td>
<td>10.00</td>
</tr>
<tr>
<td>3</td>
<td>6.00</td>
<td>6.00</td>
</tr>
<tr>
<td>4</td>
<td>7.50</td>
<td>4.00</td>
</tr>
<tr>
<td>5</td>
<td>9.00</td>
<td>2.50</td>
</tr>
<tr>
<td>6</td>
<td>10.50</td>
<td>1.00</td>
</tr>
<tr>
<td>7</td>
<td>12.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>
Payoff Sheet

Decision #2

<table>
<thead>
<tr>
<th>Number</th>
<th>A's Payoff</th>
<th>B's Payoff</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$0.00</td>
<td>$12.50</td>
</tr>
<tr>
<td>2</td>
<td>1.50</td>
<td>11.00</td>
</tr>
<tr>
<td>3</td>
<td>3.00</td>
<td>9.50</td>
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<td>4</td>
<td>4.50</td>
<td>8.00</td>
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<tr>
<td>5</td>
<td>6.00</td>
<td>6.50</td>
</tr>
<tr>
<td>6</td>
<td>10.00</td>
<td>5.00</td>
</tr>
<tr>
<td>7</td>
<td>11.50</td>
<td>1.50</td>
</tr>
<tr>
<td>8</td>
<td>13.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Decision ______

Number Chosen ______

$ _______ to be paid from _______ to _______.

Signed: ____________________________________________  A

_________________________________________________  B

In essence, these instructions told subjects that they had to choose a number between 1 and 7 (decision 1) or 1 and 8 (decision 2) and that they
would be paid in cash according to the discrete payoff functions given on pages 5 and 6 of the instructions. In addition, one subject won, by playing the hash mark game, the right to choose the number unilaterally and was told that he had earned that right by winning the game.

After reading the instructions and examining their payoffs, subjects were tested on their understanding of the rules and the consequences of decisions they might make. After both subjects had answered all of the questions correctly, and after the monitor had answered all of the subjects’ remaining uncertainties about the rules of the game, the subjects played the hash mark game and the winner of the game was orally told that he had earned the right to be controller. The subjects were then instructed to proceed with the experiment (by choosing a number).

2. Coin Flip, Moral Authority Experiments

This set of experiments resembled the previous experiment in all respects, save one. The Controller was chosen by a flip of a coin instead of by winning the hash mark game. However, the winner of the coin flip was still told by the experimenter that he had earned the property entitlement. The instructions for this experiment were identical to the above instructions except for the section on the hash mark game. In place of the section which begins, “Before each decision, both participants A and B will play a game,” and ends, “… choose any number you like by filling out the form on page seven and giving it to the monitor,” the new instructions say,

Before each decision, the monitor will flip a coin. Whoever wins this coin toss earns the right to become “controller” for that decision. If you win the coin toss and are designated controller, you may, if you wish, choose any number you like by filling out the form on page seven and giving it to the monitor.

3. Game-trigger, No Moral Authority Experiments

The next set of experiments also resembled the game trigger, moral authority experiments in almost all respects. The difference is that
whenever the moral authority instructors say, "... earns the right..." or "... earns the position...", the no moral authority instructions simply say "... is designated...". In addition, the example and the questions suggest that less moral authority is given to the controller. The example and questions are given below; other than the changes just discussed, the instructions are identical to those reproduced above.

Example: Assume that A wins the game and is designated controller for the first decision. Assume also the following payoffs for A and B.

<table>
<thead>
<tr>
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</table>

Once A has become controller, he or she may choose any number without consulting B. However, B may attempt to persuade A to join in a joint decision to choose another number and/or division of payoffs. If a joint agreement is reached, both parties must sign the agreement form on page six, stating both what the chosen number will be and how much money will be transferred from one participant's earnings to the other's. For example, A and B might sign the agreement form on page six choosing number 1 and directing that $1.00 be paid from A to B. Once the agreement form is signed the monitor will note that for this decision A is to be paid $3.00 at the end of the experiment, representing the $4.00 original payoff for number 1 less the $1.00 transferred to B, and that B is to be paid $2.00, representing the $1.00 original payoff plus the $1.00 transferred from A.
4. Coin Flip, No Moral Authority Experiments

These experiments resemble the game trigger, no moral authority experiments in the same way that the coin flip resemble the game trigger in the moral authority experiments. The only difference between these experiments and the game trigger, no moral authority experiments is that subjects were told one subject would be designated controller by a flip of a coin. There was no reference to a hash mark game.

C. Subjects

Subjects were upper level economics and management majors and management graduate students at Purdue University, and law students, upper level arts and sciences students and university staff at the University of Southern California. They were recruited in classes and by telephone and told only that they would participate in an economics decision. They were promised $4.00 per hour plus their earnings. Extra subjects were recruited in case of no-shows and paid at least $2.00 just for showing up. All subjects were inexperienced in this particular kind of experiment and friends were not

QUESTIONS (refer to payoffs on page ___)

1. Number ___ makes me the most money. Number ___ makes me the least money.

2. If the other participant is the controller and he picks number 4, I make ___.

3. If I agree to pay $1 to the other participant, and we agree on number 2, I make ___.

4. If I am the controller, I can choose any number without consulting the other participant. True or False? ______
allowed to participate together. After each experiment, we explained the nature of the experiment and the scientific importance of not telling their friends about it. Later subjects appeared to be as naive about the experiment as earlier subjects had been and there did not seem to be a time trend in the results.

III. Experimental Results

Table 1 summarizes the results of all 82 experimental decisions. Notice first that 91% of the decisions are joint profit maximizing. Thus, these results are generally consistent with those already reported in Hoffman and Spitzer.¹⁶

Second, notice that there appear to be significant differences in the payoff divisions among at least three of the four experimental treatments. Looking first at the extremes, in the no moral authority experiments, 73% of the decisions were nearly equal splits.¹⁷ However, in the game trigger, moral authority experiments more than half of the divisions gave the controller more than his individual maximum and 68% gave the controller at least his maximum. Only 22% were within $1.00 of an equal split. The other experimental treatment is intermediate. 50% of the coin flip, moral authority decisions were within $1.00 of an equal split, while 30% gave the controller at least his individual maximum.

Table 2 shows the average amount more than an equal split received by the controller in each experimental pair.¹⁸ We call it a “greed index.” The average greed index also appears different in each experiment: ranging from $1.00 for coin flip, no moral authority to $4.52 for game trigger, moral authority.

Table 3 summarizes a parametric and non-parametric one-way analysis of variance test of the null hypothesis that the mean greed indices are the same in the four experimental treatments. Both tests reject the null hypothesis:
the particular combination of allocation mechanism and moral authority instructions leads subjects to treat the property rights differently in dividing payoffs. In the no moral authority experiments they tend to ignore the differential property rights and split payoffs equally. In the game trigger, moral authority experiments most subject pairs treat the differential property rights seriously. A mean greed index of $6.25 would mean the average is at least the controller's individual maximum. $4.52 puts the average at more than 2/3 what the economic model predicts the individually rational controller would do. The greed index in the coin flip, moral authority experiments is 1/2 the index in the game trigger, moral authority experiments.

Since not all four treatments are the same, one might wonder whether there are significant interaction effects between the mechanisms for allocating property rights (coin flip vs. game trigger) and the moral authority instructions. For example, does the game trigger mechanism make it more likely that subjects will behave as though they were given moral authority to pursue self interest? A formal test of any possible interaction effect seems appropriate.

Table 4 presents the results of a two-way analysis of variance with possible interaction effects. This test suggests that the moral authority instructions make the most difference in how subjects divide payoffs. The difference in allocation mechanisms is weakly significant and the interaction effect is insignificant.

Given the high mean squared error, however, it is possible that the allocation mechanism effect is too highly correlated with the interaction effect to show up as strongly significant when both are entered simultaneously. To eliminate this possible confounding, Table 5 compares the allocation mechanisms and the moral authority instructions separately. As in Table 3, we conducted both a parametric t-test and a nonparametric Mann-Whitney U-test. The Mann-Whitney U-test has the same desirable properties as the Kruskal-Wallis
test and is, in fact, the two-population equivalent of the Kruskal-Wallis test. These results indicate that, examined alone, the allocation mechanism is slightly more significant: i.e., with a one-tailed test we can say with 94% probability that the game trigger yields a higher mean greed index than the coin flip. However, as the two-way analysis of variance already showed, the moral authority instructions seem to be more powerful than the allocation mechanisms in inducing differences in payoff divisions. The allocation mechanism is only significant at the 94% level; the moral authority instructions are significant at better than the 99% level.

IV. Discussion of Results

First, the most striking aspect of the results is that both the economic theory of property, which posits that subjects will always treat entitlements as morally justified rights, and the extreme form of the psychologists' sharing theory, which posits that subjects will always share entitlements, fail to explain our data. If subjects were to believe the economic theory of property, then subjects would share the value of being controller just as often (i.e. never) in coin flip, no moral authority experiments as in game trigger, moral authority experiments. If the extreme form of the psychologists' sharing theory were correct, subjects would share equally, regardless of the method of allocating the entitlements. Because each of our two experimental treatments produces significant changes in behavior we may reject both the economic and the extreme form of psychological sharing theories. Therefore, we must search further for theories that explain how and under what circumstances subjects treat entitlements as morally justifiable rights.

When we observed subject discussions during the experiments and debriefed the subjects after the experiments we noticed a clear relationship between the splitting of the payoffs and theories of fairness; subjects claimed to be splitting the money, and in particular choosing equal splits, based on
perceptions of a fair and just outcome. If the subjects were, in fact, attempting to be fair, then the experimental design described above provided a controlled test of the hypotheses that the subjects believed one or another moral theory of the justification of property rights. For example, one of the theories, described below, is that one has a moral right to an entitlement gained through one's labor. If subjects believed this theory of property, then the controllers should have been less willing to share in the game trigger experiments than in the coin flip experiments. There are many more theories of property that subjects might have had, and each of these generates a behavioral hypothesis. In the section below we will outline each of the theories of property rights which can provide different hypotheses for testing.

A. Theories of Property and the Associated Hypotheses

1. Fascist -- This theory posits that people will view as morally justified anything which authority tells them is morally justified. One could cast such a theory in terms of "nurture" i.e., people can be molded so as to believe anything (about morality) that authority wishes them to believe. Alternatively, one could put such a theory in a "nature" guise, i.e., people are naturally infinitely gullible about justice.

Our experimental design addressed only one version of the fascist theory. Our instructions told the subjects that they had "earned" the "right" to set the number in the moral authority mode and did not designate the controller's position by any specific term in the no moral authority mode. Hence, the experiments tested one version of property theory in which subjects were told that they could consider the controller's position to be morally justified by reference to a theory of property as dessert, in particular a theory which has roots in earning, such as the Lockean theory of property, outlined below.

If subjects' behavior is best described in these terms, then one would expect there to have been more self interested behavior on the part of
controllers in moral authority experiments than in no moral authority experi­
ments. In fact, that is exactly what was observed. However, this theory
does not tell the experimenter what level of self interested behavior to
epect of the subjects in the no moral authority mode. Nor can this theory
explain, by itself, the increase in controller greed in the move from coin
flip experiments to game trigger experiments. To explain these phenomena,
one must look to other theories.

2. Lockean — This theory posits that individuals have a morally
justifiable property right with respect to resources that have been accumulated
or developed through the individual’s expenditure of effort. The right is
given to the individual because of the “mixing of labor” with the resource.

If a subject harbors this theory of property, views the coin flip as no
labor at all, and regards playing the hash marks game as labor, then the
experimenter would observe the subject treating the controller’s position as
a morally justified right in the game trigger experiments, but not in
the coin flip experiments. In the coin flip experiments each of the subjects
contributed exactly the same amount of effort (none) at winning the coin
flip, but in the game trigger experiment the controller expended substantial
effort to earn the right. On average, then, one would expect to find a higher
greed index for game trigger experiments. That is, in fact, what was (weakly)
observed. The subjects’ behavior was consistent with their holding weakly
Lockean theories of property rights. In addition, in the game trigger, moral
authority experiments the treatment variables seem to reinforce one another.
This cell yields the highest greed index by 100% over the next highest.

One may understand this reinforcement effect in the following manner.
Although subjects are willing, to some extent, to believe that a property
entitlement is justified if authority tells them so, it is much easier to
accept the authoritative statement of morality if (1) the statement refers to an observable set of facts that (2) trigger an independently held belief about right. It is much easier for a subject to believe that he has earned the right to be controller if (1) he has in fact played a game and won the position of controller, and (2) he independently believes in the labor/dessert (Lockean) theory of property.

3. Sociobiological (or rule utilitarian) -- A sociobiological theory of property would posit that attitudes towards fairness or justice in property would be held in ways which give the holders survival advantages. One must ask, therefore, if one can tell a plausible story regarding the survival benefit of sharing "found" resources (coin flip) and holding "earned" resources (game trigger) for individually rational use. One could argue that sharing behavior for "found" resources decreases the incidence of fighting (and hence death) over the rights to such found resources, without decreasing the expected value of such resources to anyone. However, with respect to "earned" resources, perhaps it is so crucial to create incentives for greater production that it is worth risking the possibility of discord over the entitlements.

Admittedly, this story seems a bit weak. An alternative account of these attitudes towards "found" (randomly distributed) and "earned" resources stands upon rule utilitarianism. A utilitarian theory of property would posit that property should be distributed, in general, so as to maximize some monotonically increasing function of the utility of all of the citizens. The rule utilitarian variant of such a theory would demand that property be distributed and protected by a set of rules which, in general, maximize utility. The very same arguments, listed above, which seemed so weak in trying to describe survival benefits, may generate more appeal when redescribed as maximizing utility or happiness.
To the extent that either of these stories comprises a valid theory, it can explain the difference in greed index between coin flip and game trigger games. However, to use these theories to explain the difference in controller greed between no moral authority and moral authority instruction experiments one must believe that, for the sociobiological explanation, there are survival benefits to conforming one's moral beliefs to authoritative statements. For the rule utilitarian theory, using authoritative pronouncements about morality must, in general, increase utility. Perhaps a rule utilitarian would explain that such authoritative pronouncements could decrease the time that individual citizens have to spend worrying about such matters, reduce resources spent on discord over moral issues, and reduce uncertainty. Regardless of which of these explanations one believes, it will closely approximate the fascist theory of property discussed above.

B. Unhelpful Theories of Property

Two theories of property seem to have been disconfirmed by our results.

1. Marxist -- Marxist theories of property suggest that entitlements to resources (in consumption) should be distributed according to some "needs" theory. However, without some theory as to why subjects would perceive controllers' needs to vary systematically with the experimental designs, (and we have no such theory) the Marxist theory fails to explain subject behavior.

2. Act Utilitarian -- This version of utilitarian theory posits that property rights should be allocated, in any particular circumstance, so as to maximize utility. So, for example, if one experimental subject had a very high utility for money, and the other did not, then one might allocate the total earnings asymmetrically. However, one would need a theory as to why the subjects' perceptions of their utility for money would vary systematically with the experimental design. For example, why did all subjects perceive that they had exactly equal utility in the coin flip, no moral authority
experiments? We have no answers at this juncture, except to suggest that act utilitarianism fails to explain the moral foundations of subjects' actions.

V. Applicability of Experimental Results

To what extent are our laboratory (i.e., experimental) observations about subjects' attitudes towards theories of property applicable to nonlaboratory environments? This question must be answered in two stages. First, do individuals' beliefs about theories of property depend upon whether or not they are in a laboratory setting? Second, to the extent that individuals' beliefs about theories of property are independent of the laboratory setting, which nonlaboratory environments sufficiently resemble (to subjects) the laboratory environments?

A. Behavior Induced by Experimental Setting

First, an individual's beliefs about property would be dependent upon the laboratory setting if he were to believe (or fail to believe) some theory of property only in the laboratory setting, and not in nonlaboratory settings. For example, a subject might believe that he should behave as a Lockean in an experiment, but as a Marxist elsewhere. Why would one see such behavior? There are three obvious sources of concern. First the fascist theory’s appeal depends, in part, upon the subject’s willingness to accept the validity of the authoritative source. If a subject believes in "science," but cares little for traditional social authority figures (such as governmental leaders), then the fascist theory will be overconfirmed in the experimental setting. Conversely, if the subject believes that authority is valid only when it relies upon some traditional social institution for justification, and the subject perceives less valid authority in the experimenter, then the fascist theory will be underconfirmed. A priori, we have no strong suspicions about the general direction of bias, if any. We merely flag this consideration...
for the reader who may be thinking about applying our results to some particular nonlaboratory setting.

Second, all of the theories of property, including the fascist, may be subject to some sort of observer effect. A subject might wish to behave in some manner, e.g. in accord with the economists’ beliefs that all entitlements are rights, but not wish to do so while being watched because the Lockean theory of property is more polite. Two considerations suggest that observer effects should not be particularly troubling for most applications of these experiments. First, we gave the subjects no motivational instructions. Hence, subjects’ theories of politeness probably accompanied them as they left the experiment. Second, virtually all nonlaboratory applications will involve observed behavior. Whether one is talking about nuisance disputes between neighbors, compulsory copyright licensing of cable television, or settling lawsuits, the participants’ behaviors will be seen by all those with whom they bargain, and probably some observers as well. As long as people hold the same theories about politeness in laboratory and nonlaboratory settings, and they know they are being watched in both settings, observer effects hold not vary much.

Last, one might suspect that some subjects act differently in laboratory settings because the stakes are not "real". In particular, one might fear that the stakes were not large enough to make subjects treat the experiment as "real life." Two factors suggest that this probably poses no great difficulty. First, we replicated the Hoffman and Spitzer experiments with two changes in payoffs: first, we divided all payoffs by 4; second, we multiplied all payoffs by 4. Neither change produced any change in results; all subjects split payoffs equally. These results strongly suggest that the size of the payoffs should not be a source of concern. In the experiments where payoffs were 4 times as large, a controller had to give up at
least $20.00 to be able to equal split. It would seem that this much money should be enough to get student subjects' serious attention. Second, debriefing the subjects after the experiments tended to confirm that they were treating the experimental situation as "real." When we asked subjects who had equal split why they had done so, they responded that they were dealing with real money, and that fair outcomes are important in real situations. To the extent that subjects are capable of accurately characterizing their own behavior, their responses suggest that they were not acting in a frivolous manner.

At this stage of the analysis, some leap of faith is ultimately required. If money from an experimenter is regarded as somehow different from money in nonlaboratory settings, our results cannot be applied with confidence. However, we have neither data to suggest that this is true, nor data sufficient to prove that it is false. Hence, the scholar must make a judgement, partly aesthetic and partly religious in nature, about whether or not to apply our data to any situation.

B. Matching Control Variables and Institutions

To the extent that one concludes that experimental subjects' behaviors and beliefs about theories of property accurately characterize human behaviors and beliefs in some nonexperimental setting, he must still carefully match experimental control variables to institutional features. In particular, matching judicial decisions to either the coin flip/game trigger or moral authority/no moral authority controls could be very difficult. First, consider whether a judicial decision will be viewed, by the winner, as a random event. If the winner is an extreme legal realist who believes that each fact situation is so unique that no principled or consistent application of rules is possible, and that a judge instead decides cases based upon the nature of his most recent meal, then the decision may be regarded as a random variable. Alternatively,
the winner may believe a version of legal formalism which posits that the outcome of any legal case may be deducted in a straightforward, logical fashion from a preexisting set of rules, without the interjection of any subjective element, be it either a meal or a moral, into the process. Such a winner would view the decision as the result of a deterministic process.

Now, second, consider whether a judicial pronouncement that "Ms. A has property right X" will be regarded by Ms. A as an authoritative statement with moral force. Ms. A's jurisprudential views play a central role in the analysis. If A is an extreme legal realist she may be less inclined to regard the court's decree as morally authoritative than if she is a formalist who thinks that the structure of legal rules embodies valid social norms.

Both of the two inquiries above require that a scholar be able to separate realists from formalists in his target population before he can apply our results. More generally, the scholar will have to exhibit a sensitivity to the question of how the members of the studied population regard the institutional elements under scrutiny.

Only where the scholar has good reason to believe that he can characterize the attitudes of citizens towards crucial institutional parameters, such as judicial decisions, congressional amendments to the Internal Revenue Code, or offshore oil leases, may he proceed to apply our results. Otherwise, he should forbear from doing so.

VI. Conclusion

Subjects tended to regard the controller's position as an entitlement that required moral justification, rather than as something which must always be or need never be shared. Subjects' behavior is best described as acting in accord with either the fascist or Lockean theories of property, or both. When the experimental design suggested to subjects that they could regard the controller's perogatives as morally justified by both the fascist and
Lockean theories, there seemed to be a reinforcement which led subjects to be quite self interested. Subject behavior could also be described, to some extent, by the sociobiological and rule utilitarian theories. Conversely, subjects acted in ways which seem inconsistent with the hypothesis that they believe either Marxist or act utilitarian theories.

These results may have important implications for economic and legal policy. The results suggest that individuals will be more willing to exercise their property entitlements when they believe the method of allocating those entitlements is just. In particular, they predict that property entitlements assigned by chance and not reinforced by moral authority or hard work may be regarded less selfishly than these entitlements conferred in other manners. Economic and legal policy prescriptions based on models of individual reactions to different sets of incentives should take account of these differences where it is possible to do so, or the effects of different economic policies may be predicted incorrectly.
<table>
<thead>
<tr>
<th>Experiment</th>
<th>Number of Decisions</th>
<th>$\theta$ of Joint Maxima $N_1$</th>
<th>Equal Split $N_2$</th>
<th>Equal $$1$ $N_3$</th>
<th>Controller receives his maximum $N_4$</th>
<th>Controller receives more than maximum $N_5$</th>
<th>Halfway between Equal and Controller Max $N_6$</th>
<th>Other $N_7$</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Coin Flip</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. No Moral Authority</td>
<td>22</td>
<td>20</td>
<td>10</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>2. Moral Authority</td>
<td>20</td>
<td>19</td>
<td>9</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>B. Game Trigger</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. No Moral Authority</td>
<td>22</td>
<td>18</td>
<td>9</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>2. Moral Authority</td>
<td>22</td>
<td>21</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>12</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>86</td>
<td>78</td>
<td>32</td>
<td>12</td>
<td>13</td>
<td>20</td>
<td>7</td>
<td>2</td>
</tr>
</tbody>
</table>
### Table 2

**Average Dollar Amount More Than an Equal Split Received by the Controller in Each Experimental Pair: "Greed Index"**

<table>
<thead>
<tr>
<th>Coin Flip</th>
<th>No Moral Authority</th>
<th>Moral Authority</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Difference</td>
<td>Rank of Difference</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>8</td>
<td>.25</td>
</tr>
<tr>
<td>0</td>
<td>8</td>
<td>2.00</td>
</tr>
<tr>
<td>0</td>
<td>8</td>
<td>3.125</td>
</tr>
<tr>
<td>0</td>
<td>8</td>
<td>5.75</td>
</tr>
<tr>
<td>.125</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Total Average</td>
<td>11</td>
<td>178</td>
</tr>
<tr>
<td>Average n</td>
<td>1.00</td>
<td>16.18</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Game Trigger</th>
<th>No Moral Authority</th>
<th>Moral Authority</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Difference</td>
<td>Rank of Difference</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>8</td>
<td>.90</td>
</tr>
<tr>
<td>0</td>
<td>8</td>
<td>2.50</td>
</tr>
<tr>
<td>0</td>
<td>8</td>
<td>3.75</td>
</tr>
<tr>
<td>0</td>
<td>8</td>
<td>5.0</td>
</tr>
<tr>
<td>.25</td>
<td>18.5</td>
<td></td>
</tr>
<tr>
<td>Total Average</td>
<td>12.65</td>
<td>185.5</td>
</tr>
<tr>
<td>Average n</td>
<td>1.15</td>
<td>16.86</td>
</tr>
</tbody>
</table>


### Table 3
One-Way Analysis of Variance Tests: Parametric and Non-Parametric

**Null Hypothesis:** All four experimental treatments yield the same greed index.

**Alternative Hypothesis:** The greed indices are different.

<table>
<thead>
<tr>
<th>Test</th>
<th>Calculation of Test Statistic</th>
<th>Degrees of Freedom</th>
<th>Appropriate Test Statistic</th>
<th>Value of Test Statistic</th>
<th>Test</th>
<th>Rejection Significance Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parametric one-way analysis of variance (unequal numbers in each cell)</td>
<td>Sum of squares for treatments = $\sum \sum y_{ij} \bar{y}<em>{ij} - y</em>{..} \bar{y}_{..}$ (SSTR)</td>
<td>3</td>
<td>$F = \frac{\text{SSTR}}{3}$ (\frac{\text{SSE}}{40})</td>
<td>6.80</td>
<td>$F(3,40)$</td>
<td>99% +</td>
</tr>
<tr>
<td></td>
<td>Sum of squares for error = $\sum \sum \left(y_{ij} - \bar{y}_{ij}\right)^2$ (SSE)</td>
<td>40</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kruskal-Wallis non-parametric one-way analysis of variance</td>
<td>$H = \frac{12}{N(N+1)} \sum_{j=1}^{k} \frac{\sum_{i=1}^{n_j} r_{ij}}{n_j} - 3(N+1)$</td>
<td>1</td>
<td>$\chi^2 = H$</td>
<td>12.50</td>
<td>$\chi^2 (3)$</td>
<td>99% +</td>
</tr>
</tbody>
</table>

**Key:**
- $y_{ij}$ = observation $i$ in cell $j$
- $\bar{y}_{ij}$ = mean of cell $j$
- $y_{..}$ = sum over all $i$ and $j$ (grand total)
- $\bar{y}_{..}$ = grand mean
- $R_j$ = sum of rank in cell $j$
- $n_j$ = number of observations in cell $j$
- $N$ = total number of observations
### TABLE 4
PARAMETRIC TWO-WAY ANALYSIS OF VARIANCE: UNEQUAL NUMBERS IN EACH CELL

<table>
<thead>
<tr>
<th>Null Hypothesis</th>
<th>Calculation of Sum of Squares</th>
<th>SS</th>
<th>D.F</th>
<th>Mean Square (MS)</th>
<th>F = MS/MSE</th>
<th>Rejection Significance Level, F(1,39)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Coin Flip and Game Trigger yield same greed index</td>
<td>( \sum_{i} y_{i} \bar{y}_{i} - y.. \bar{y}.. )</td>
<td>13.97</td>
<td>1</td>
<td>13.97</td>
<td>3.16</td>
<td>92%</td>
</tr>
<tr>
<td>2. No moral authority and moral authority yield same greed index</td>
<td>( \sum_{j} y_{j} \bar{y}_{j} - y.. \bar{y}.. )</td>
<td>65.37</td>
<td>1</td>
<td>65.37</td>
<td>14.37</td>
<td>99% +</td>
</tr>
<tr>
<td>3. No interaction between allocation mechanism and moral authority instructions</td>
<td>( \sum_{i} \sum_{j,k} y_{i,j,k} \bar{y}_{i,j,k} + y.. \bar{y}.. )</td>
<td>8.50</td>
<td>1</td>
<td>8.50</td>
<td>1.92</td>
<td>less than 90%</td>
</tr>
<tr>
<td></td>
<td>( \sum_{i} y_{i} \bar{y}<em>{i} - \sum</em>{j} y_{j} \bar{y}_{j} )</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td>( \sum_{i} \sum_{j,k} (y_{i,j,k} - \bar{y}_{i,j,k})^2 )</td>
<td>172.26</td>
<td>39</td>
<td>4.417 (MSE)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>( \sum_{i} \sum_{j,k} (y_{i,j,k} - \bar{y}..)^2 )</td>
<td>260.83</td>
<td>42</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Key to items not keyed in Table 3:
- \( y_{i,j,k} \) = observation \( k \), allocation mechanism \( i \), moral authority instructions \( j \)
- \( \bar{y}_{i,j,k} \) = mean of cell \( i,j \)
- \( \bar{y}_{i} \) = sum of observations for allocation mechanism \( i \)
- \( \bar{y}_{..j} \) = mean for instructions \( j \)
TABLE 5
PARAMETRIC AND NON-PARAMETRIC COMPARISONS OF GREED INDICES FOR ALLOCATION MECHANISMS AND MORAL AUTHORITY INSTRUCTIONS

<table>
<thead>
<tr>
<th>Null Hypothesis</th>
<th>Test</th>
<th>Calculation of Test Statistic</th>
<th>Value of Statistic</th>
<th>D.F.</th>
<th>Test</th>
<th>One-tailed Rejection Significance Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coin Flip and Game Trigger yield same Greed Index</td>
<td>t-test</td>
<td>$t = \frac{(\bar{y}_1 - \bar{y}_2)}{\sqrt{\frac{1}{n_1} + \frac{1}{n_2}} \sqrt{\frac{(n_1-1)\sigma_1^2 + (n_2-1)\sigma_2^2}{n_1n_2}}}$</td>
<td>1.53</td>
<td>41</td>
<td>t(41)</td>
<td>942</td>
</tr>
<tr>
<td></td>
<td>U-test</td>
<td>$U = n_1n_2 + \frac{n_1(n_1+1)}{2} - R_1$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$z = \frac{U - n_1n_2}{\sqrt{n_1n_2(n_1+n_2+1)}}$</td>
<td>1.54</td>
<td>41</td>
<td>Z</td>
<td>942</td>
</tr>
<tr>
<td>No Moral Authority and Moral Authority yield same Greed Index</td>
<td>t-test</td>
<td>$t = \frac{(\bar{y}_1 - \bar{y}_2)}{\sqrt{\frac{1}{n_1} + \frac{1}{n_2}} \sqrt{\frac{(n_1-1)\sigma_1^2 + (n_2-1)\sigma_2^2}{n_1n_2}}}$</td>
<td>3.70</td>
<td>41</td>
<td>t(41)</td>
<td>997</td>
</tr>
<tr>
<td></td>
<td>U-test</td>
<td>$U = n_1n_2 + \frac{n_1(n_1+1)}{2} - R_1$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$z = \frac{U - n_1n_2}{\sqrt{n_1n_2(n_1+n_2+1)}}$</td>
<td>2.39</td>
<td>41</td>
<td>Z</td>
<td>992</td>
</tr>
</tbody>
</table>

Key to items not keyed in Tables 3 and 4:

- $n_1$ = number of observations in smaller sample in each case
- $\sigma_1^2, \sigma_2^2$ = sample standard deviations in each case
- $R_1$ = sum of ranks in smaller sample (allocation mechanism)
- $R_1$ = sum of ranks in smaller sample (moral authority instructions)
Footnotes

1 We use the following terminology in this paper. "Entitlements" are legally enforceable claims (in a real politic sense) to economic resources. "Rights" are morally justified entitlements.

2 Recently, however, some economists, using implicit contract theory and the theory of repeated games, have developed models of altruistic behavior in economics, for example, Gary S. Becker, A treatise on the Family (1981), models family relations as implicit or explicit contractual agreements to exploit gains from trade among family members. According to Becker, altruism is observed in family relations because reciprocal altruism efficiently enforces cooperative agreements. If everyone agrees that each member will freely give to all others without cheating or shirking then everyone knows that the total surplus for distribution will be enough larger to make everyone better off. Even selfish members are induced to behave altruistically if everyone else is altruistic. He calls this "The Rotten Kid Theorem."

Selfish families have to use up a significant proportion of their joint resources negotiating contracts and monitoring one another's behavior.

Mordecai Kurz, Altruistic Equilibria, in Economic Progress, Private Values, and Public Policy (Bela Balassa and Richard Nelson eds. 1977), uses the theory of repeated games to describe how an equilibrium set of cooperative norms develops in an economy which generates significant gains from cooperation. Along the same line as Becker, he argues that cooperative norms reduce transactions costs and increase the probability that a surplus from cooperation will be generated.

Robert J. Aumann, Acceptable Points in Cooperative n-Person Games, in IV Contributions to the Theory of Games, Annals of Mathematics Studies #40, (A. W. Tucker and R. D. Luce eds. 1959), has shown that in an infinitely repeated cooperative game, the cooperative solution is a strong Nash
equilibrium of the dynamic supergame. That means that if everyone else plays cooperatively at some iteration, you maximize expected utility over the game by playing cooperatively. The reason is that you know you will be punished in the future for deviating from cooperation now. The cost of future punishment outweighs the current benefit from not cooperating.

Kurz calls such an equilibrium an "efficient altruistic equilibrium" when individual utility functions are interrelated and shows that there exists a set of personalized prices which will support such an equilibrium as a competitive equilibrium. He then suggests that many of the "prices" are really norms or rules of conduct governing interpersonal exchange:

These exchange rates should be interpreted as "social norms" or "norms of conduct" since they state what is a "fair and proper" rate of exchange between each pair of commodities and services some of which may never be traded in a market. (p. 197)

David Collard, Altruism and Economy (1978), also discusses altruistic equilibria, but he is more cautious than Kurz because he explicitly recognizes an altruistic version of the free rider problem. He suggests that even if everyone is altruistic, there is an incentive to wait for someone else to perform a costly altruistic act, as long as one's own utility is weighed more highly than the utility of others. He thinks this will be a particular problem with income transfers. Even if all rich people feel altruistic towards the poor, each rich person has an incentive to give less than the socially optimum amount to charity. For that reason he extends the analysis in Olson, The Logic of Collective Action (19) to altruistic economies: i.e., small groups are more likely to achieve efficient altruistic equilibria than large ones.

While all these studies recognize that economic agents may give away claims to resources without compensation they do not explore the question of when selfish vs. altruistic behavior will be observed. The one possible
exception is Becker, who suggests that family allocations will be altruistic, but market allocations will be selfish. Kurz, however, argues that even in the marketplace altruism is a strong Nash equilibrium if transactions are infinitely repeated. The problem is that there are many Nash equilibria, both selfish and altruistic. Economic theory does not predict which one will be chosen.


Looking at individual experiments, Philip Brickman, Adapation Level Determinants of Satisfaction with Equal and Unequal Outcome Distributions in Skill and Chance Situations, 32 J. Personality & Soc. Psych. 191 (1975), found that subjects reported being most satisfied with equal payments even when their skills were different. Elena M. Carles and Charles S. Carver, Effects of Person Salience versus Role Salience on Reward Allocation in a Dyad, 11 J. Personality & Soc. Psych. 207 (1979), found that female subjects allocated rewards equally regardless of inputs when the other person was presented as similar to the subjects. In Arnold Kahn, Helmut Lamm, and Robin E. Nelson, Preferences for an Equal or Equitable Allocator, 35 J. Personality & Soc. Psych. 837 (1977) subjects generally preferred an equal allocator. They concluded that equality will be preferred to payment according to relative output in cooperative situations, by females, and when the person allocating has contributed a great deal and might "deserve" more.
They suggest that taking more is socially unacceptable.

Irving M. Lane and Lawrence A Messe, Equity and the Distribution of Rewards, 20 J. Personality & Soc. Psych. 1 (1971), argue that there is a threshold effect as long as the other person has done some minimum quantity or quality of work, rewards are divided equally. Melvin J. Lerner, The Justice Motive in Social Behavior: Introduction, 31 J. Soc. Issues 1 (1975), argues that equality will be the just norm whenever the other person is viewed as a "person" rather than as playing some well-defined economic role such as "boss." Gerald S. Leventhal, Thomas Weiss, and Richard Buttrick, Attribution of Value, Equity, and the Prevention of Waste in Reward Allocation, 27 J. Personality & Soc. Psych. 276 (1973), had subjects distribute perishable and non-perishable items to others who had different past rates of use. They only violated equality when the goods might be wasted by spoilage. William R. Morgan and Jack Sawyer, Bargaining Expectations and the Preference of Equality Over Equality, 6 J. Personality and Soc. Psych. 139 (1967), found classmates ignored differential inputs and allocated equally. In E. Gary Shapiro, Effect of Expectations of Future Interaction on Reward Allocations in Dyads: Equity or Equality, 31 J. Personality & Soc. Psych. 873 (1975), subjects divided rewards equally if they expected to interact in the future.

Many other researchers concur. Some examples include: Jerald Greenberg, Allocator-Recipient Similarity and the Equitable Division of Rewards, 41 Soc. Psych. Quar. 337 (1978)., Gerald S. Leventhal and H. D. Whiteside, Equity and the Use of Rewards to Elicit High Performance, 25 J. Personality & Soc. Psych. 75 (1973); Rudy V. Nydegger and Guillermo Owen, The Norm of Equity in a Three-Person Majority Game, 22 Behavioral Sci. 32 (1977); Dean G. Pruitt, Methods for Resolving Differences of Interest-Theoretical Analysis, 28 J. Soc. Issues 133 (1972); Harry T. Reis and Joan Gruzen, On Mediating Equity,

Note that this rule is equivalent to an economic rule which allocates rewards to keep the ratios of payments to the average product of labor equal:

\[
\frac{W_1}{AP_{L1}} = \ldots = \frac{W_n}{AP_{Ln}}
\]

This is in contrast to the efficient payment rule which equates the the ratios of wages and marginal products of labor:

\[
\frac{W_1}{MPL_1} = \ldots = \frac{W_n}{MPL_n}
\]


Walster, Bercheid, and Walster, supra note 4 originally proposed this idea as a somewhat formal theory. Other experimental support includes the following: Ronald L. Cohen, Mastery and Justice in Laboratory Dyads: A Revision and Extension of Equity Theory, 29 J. Personality & Soc. Psych. 464 (1974); Gerald S. Leventhal, Thomas Weiss, and Gary Long, Equity, Reciprocity, and Reallocating Rewards in the Dyad, 13 J. Personality & Soc. Psych. 300
S. J. Morse, Joan Gruzen, and Harry T. Reis, Nature of Equity Restoration — Some Approval — Seeking Considerations, 12 J. Experimental Soc. Psych. 1 (1976); and Nydegger and Owen, supra note 3.

6. Get cites. Experimental results on equity and equality can provide these scholars with evidence about crucial variables in their theories about the law.

7. Actually, at least the law of property, contract and tort is all implicated in this analysis.

8. See Edward O. Wilson, On Human Nature (19_) at pages To a sociobiologist, the experimental evidence discussed above provides valuable information about human behavior.

9. Need cites. Nurture theorists might use such experimental results to deduce the implicit moral teaching of society towards property. To the extent that a theorist has beliefs (or perceptions) about correct moral theories, he may use the result of these experiments to inform, in part, his judgment about proper directions for social policy.


11. See Robert Apsler and Henry Friedman, Chance Outcomes and the Just World: A Comparison of Observers and Recipients, 31 J. Personality & Soc. Psych. 887 (1975); and Brickman, supra note 3, for evidence that chance distributions of payments are not considered fair unless they are equal.

12. There is also considerable evidence to suggest that subjects can be led to believe they are different and act accordingly. See for example, Philip Brickman, Preference for Inequality, 40: Sociometry 303 (1977); Carles and Carver, supra note 2; Cohen, supra note 4; Greenburg, supra note 2; Wendy J. Harrod, Expectations from Unequal Rewards, 43 Soc. Psych. quar. 126 (1980); Melvin J. Lerner, Evaluation of Performance as a Function of Performer’s
Reward and Attractiveness, 1 J. Personality & Soc. Psych. 355 (1965); Leventhal, Weiss, and Buttrick, supra note 3; Leventhal, Weiss, and Long, supra note 5; Parcel and Cook, supra note 4; and Shaprio, supra note 3.

13 Some of the discussion of experimental design is taken from Hoffman and Spitzer, supra note 6.

14 Tests are included with the instructions.

15 The experiments replicate the Hoffman and Spitzer, supra note 6, experiments using the precise wording used in the moral authority experiments. We also ran some game trigger experiments using the Hoffman and Spitzer instructions. The results are generally unaffected.

16 ibid. Thus, these experiments also provide significant tests of the Coase Theorem. Moreover, these results can be interpreted, in brief, to show that the Coase Theorem is extremely robust with respect to different methods of initially allocating the entitlements, even where the different methods of initial allocation produce widely differing attitudes towards the justice of treating the entitlements as rights. These insights will be explored at much greater length in another paper.

17 The only effect of the change in instructions shows up in the coin flip, no moral authority experiments. The original set of experiments reported in Hoffman and Spitzer, supra note 6, resulted in 100% equal splits. These show only 5 of 11 exactly equal and 8 of 11 nearly equal, giving a significant instruction effect. However, the statistical results discussed below are largely unaffected by this instruction effect. The only difference is that the differences between coin flip and game trigger payoff divisions are slightly weaker with the new instructions.

18 We present it as an average for each experiment so the data will be independent and identically distributed. Each number is an average of two highly correlated numbers since the two outcomes in each experiment were not
independent of one another. Each experiment is, however, independent of each other experiment and, within each experimental treatment they are identically distributed. The subjects are all drawn from the same subject pool and given the same set of instructions.

The non-parametric Kruskall-Wallis test is almost as powerful as the analysis of variance when all the assumptions are met; but it does not assume the observations are normally distributed. Since many of the observations are 0 and the distribution truncates at 0, the assumption of normality does not hold. Sources for the tests summarized in Table 3 are: parametric one-way analysis of variance: Gerald L. Ericksen, Scientific Inquiry in the Social Sciences (1970), p. 200. Kruskall-Wallis test: Sidney Siegel, Nonparametric Statistics for the Behavioral Sciences (1956), p. 185.

Sources for the test in Table 4 are: Two-way analysis of variance with equal numbers in each cell: William L. Hayes, Statistics for the Social Sciences, (1973), pp. 501-505. Adjustment for different numbers in each cell: C. Radhakrishna Rao, Linear Statistical Inference and Its Applications, pp. 211-214; and, conversations with Rao Kadyala, Purdue University.

Sources for the tests summarized in Table 5 are: Erickson (p. 162) and Siegel (p. 121), supra, note 19.

Alternatively, one can rely on the "as if" principle throughout the entire analysis. One can say that subjects act "as if" they held certain theories of property, that the law should be (or is) shaped "as if" it reflects widely moral norms, see text at note 6.

The fascist theory is, in virtually all respects, empirically indistinguishable from the assertion, found in works of those skeptical of experimental work, that subjects merely do that which they believe will please the experimenter. Any behavioral proposition that can be put as a) I want to please experimenter and he wants X, can also be phrased as b) I will do whatever is just and the experimenter, who is a valid source of moral authority, has said
X = justice.

To the extent that our paper finds significant support for the fascist theory, it may also give support to the critics of experimental techniques. At the very least these results suggest that the experimenter must pay closer attention to his instructions and the incentives instilled in his subjects.

24 John Locke, Second Essay Concerning Civil Government, Chapter V (____). Note that this theory is empirically indistinguishable from equity theory, supra, note 4.


26 See Wilson, supra, note 8.

27 if one can tell equally plausible stories regarding the survival benefit of different beliefs about property, then the sociobiological theory does not generate a clean, testable hypothesis. It can only be regarded, in such circumstances, as a sophisticated form of ad hoc rationalization.


30 The lack of precision which plagues the sociobiological theory, see n. 8, supra, also mars utilitarian theories of property. To the extent that
one does not know what are the tastes and preferences of the citizens, he cannot describe the expected (preferred) pattern of property within a utilitarian theory. In particular, economists generally avoid cardinal welfare indices because they require interpersonal comparisons of utility.

31 Regardless of which, if either, of those two explanations comprises a valid, testable theory, there remains a strong intuition that a random distribution of resources is difficult to justify. Robert Nozick, Anarchy, State and Utopia 159 (1974). In Private Property and the Constitution (1977), Bruce Ackerman explains that a restrained, utilitarian judge might order just compensation when a governmental "agency is obliged to burden one property owner rather than another" but the agency's "objectives do not permit it to derive a reason for choosing a unique owner as the one who will most appropriately bear the cost" so as to eliminate incentives for corruption. Id. 52-53. Similarly, a restrained Kantian jurist would order just compensation under similar circumstances. Id. 80. This circumstance seems to represent the reflection of randomly distributed resources in our experiments: i.e. random harm. Ackerman's reasoning leads his hypothetical jurists to spread the harms, just as our subjects chose to spread the resources.

32 There are many additional theories of property, none of which were tested by our experiments. Some of the leading theories in this group are: Margaret J. Radin, Property and Personhood (1982) (suggesting that "Once we admit that a person can be bound up with an external 'thing' in some constitutive sense, . . . the person should be accorded broad liberty with respect to control over that 'thing'."); John Rawls, A Theory of Justice ( ) (Institutions (including the law of property) should be created so as to maximize the lot of the worst off individual in society); and Thomas C. Grey, Property and Need: The Welfare State and Theories of Distributive Justice, (19__) (Property rights should be rearranged
wherever necessary to guarantee three basic rights: (1) equal opportunity; (2) freedom from "economic coercion"; and (3) the general ethic of fraternity.)

33 Get cites.

34 Luce and Raiffa, Games and Decisions (1957).

35 Obviously, to the extent that the various theories of property tested herein claim to characterize everywhere the behavior of individuals, our results disprove, as a positive matter, the Marxist and act utilitarian theories. Alternatively, one might conclude that these two theories require reformulation as to the domains to which they apply. This process of reformulation will require the scholar to consider precisely the same factors that help one understand the applicability of laboratory data.

36 This question, in its most general form, concerns the dependence (or independence) of human choice upon the specific institutions in which the behavior takes place. To put the point slightly differently, how many institutional features exert substantial influence upon subjects' behavior? Experimental economists have endeavored to uncover general, systematic relationships between preferences, institutions, and physical possibilities, as inputs, and outcomes, as outputs, by relying upon at least the following two axioms:

1) "[R]elationships between preferences, institutional parameters, and outcomes are independent of the sources of preferences." Louis L. Wilde, On the Use of Laboratory Experiments in Economics in Philosophy, 137, 145 (1981); and

2) "[T]he relationship between outcomes, preferences and institutions is (supposed to be) independent of the nature of the social alternatives." Charles R. Plott, The Application of Laboratory Experimental Methods to Public

The textual discussion represents an exploration of the acceptability of these two axioms to our experiments.

37 Recall that the fascist theory is that one should believe and act upon authoritative statements about property rights.

38 Of course, there is experimental evidence that "science" provides for many people, a significant source of authority, [cites]. This tells nothing, however, about the relative strength of authority inherent in "science" vis a vis other social institutions.

39 Wilde indicates that one may eliminate these effects with respect to fellow subjects by making the subjects' payoffs private. Wilde, supra note 36, 142. Obviously, these observer effects may not be eliminated where the theory being tested, such as the Coase Theorem, requires full information for the subjects. In addition, the experimental monitor will always be observing the outcomes.

40 Ellickson, Cooter, Posner.

41 Besen, Manning & Mitchell.

42 Schwartz, Priest, Cooter.

43 If subjects regard observation by the experimenter as different than observation by others, result might be affected. For example, if the subject regarded the experimenter as a potential source of potent moral censure, similar to a clerical figure, but did not so regard (nonlaboratory) business associates, we would observe more "polite" behavior in the experiment.

[more research & cites]

44 Supra, note 6.
45 Payoffs for these experiments were:

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46 Payoffs for these experiments were:

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47 The opportunity cost of time for most students is under $5 per hour.

48 Felix Cohen, Leon Green, Jerome Frank.

The results actually cannot distinguish between an innate sharing rule for found resources and a moral rule which is learned through social-  
ization. To distinguish between the sociobiological position and the nurture position we would need to be able to show that different groups in the population instilled recognizably/different views about property in their children. Otherwise we may be observing either an innate moral code or a universally taught code which is not actually innate. Our data cannot be used for that purpose because we did not try to control for such variables as sex, race, age, religion and income. A truly complete experimental design would have to control for all of these variables. For example, one would ideally run a coin flip experiment with male, caucasian, 21 year old, poor and Catholic subjects, and then with male, caucasian, 21 year old, poor and Protestant subjects, then with male, caucasian, 21 year old, poor and Jewish subjects, then with male, caucasian, 21 year old, poor and atheist subjects, etc.

With two sexes, 5 races, 10 age bracket classes, 5 religions, and 3 income classes, each version of the experiment would require 1500 sets of data for full sociological control. In a two by two design such as the one which we are using, we would need 6000 sets of experiments. Such a project is clearly beyond our resources.
Cross Theorem: 
Bargaining will derive the joint maximization 

Equity Theory

Who is this

John Oddal - Groq - went to Polem