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DOES DISPUTING THROUGH AGENTS ENHANCE COOPERATION? EXPERIMENTAL EVIDENCE

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ABSTRACT

A distinctive characteristic of our formal mechanisms for conflict resolution is that litigation is carried out by agents chosen by the disputing principals. Does the fact that clients choose lawyers to carry on their disputes facilitate dispute resolution or instead exacerbate conflict? The dominant contemporary view is that the involvement of lawyers magnifies the inherent contentiousness of litigation and typically leads to wasting social resources by prolonging and escalating the conflict in ways that may enrich the legal profession but not the clients. But in a recent article, Gilson and Mnookin suggested another possibility: by choosing lawyers with reputations for cooperation, clients might be able to commit to cooperative litigation strategies in circumstances where the clients themselves would not otherwise trust each other.[1] Using the methodology of experimental economics, this paper presents the result of our test of their idea that by choosing cooperative agents under well specified procedures, principals may be able to cooperate more often than they could do on their own. Our experimental findings are consistent with the Gilson-Mnookin hypothesis.

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[1]Ronald J. Gilson and Robert H. Mnookin,. *Disputing Through Agents: Cooperation and Conflict Between Lawyers in Litigation* 94 COLUM. L. REV. 509 (1994) (hereinafter "Mnookin/Gilson").

Does Disputing Through Agents Enhance Cooperation?
Experimental Evidence

by
Rachel Croson and Robert H. Mnookin[1]

I. Introduction

A distinctive characteristic of our formal mechanisms for conflict resolution is that litigation is carried out by agents chosen by the disputing principals. Does the fact that clients choose lawyers to carry on their disputes facilitate dispute resolution or instead exacerbate conflict? The dominant contemporary view is that the involvement of lawyers magnifies the inherent contentiousness of litigation and typically leads to wasting social resources by prolonging and escalating the conflict in ways that may enrich the legal profession but not the clients.[2] But in a recent article, Gilson and Mnookin suggested another possibility: by choosing lawyers with reputations for cooperation, clients might be able to commit to cooperative litigation strategies in circumstances where the clients themselves would not otherwise trust each other.[3] Using the methodology of experimental economics, this paper presents the results of our test of their idea that by choosing agents under well-specified procedures, principals may be able to cooperate more often than they could without such procedures.

The use of experimental economics methods in legal research is a recent but growing practice. Hoffman and Spitzer provide an experimental test of some implications of the Coase Theorem, and a later paper by the same authors examines the implications of entitlements and rights in that setting.[4] Hoffman and Spitzer's papers highlight limitations of the Coase Theorem, and discuss the implications of those limitations for the law and legal practice. Coursey and

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[2]For sources criticizing the legal profession unnecessarily intensifying hostility between disputants, see Ronald J. Gilson and Robert H. Mnookin, *Disputing Through Agents: Cooperation and Conflict Between Lawyers in Litigation,* 94 Columbia L. Rev. 509, 510 nn.8-10 (1994).

[3]Ronald J. Gilson and Robert H. Mnookin,. *Disputing Through Agents: Cooperation and Conflict Between Lawyers in Litigation* 94 COLUM. L. REV. 509 (1994) (hereinafter "Gilson/Mnookin.").

[4]See Elizabeth Hoffman and Matthew Spitzer, "The Coase Theorem: Some Experimental Tests." *Journal of Law and Economics*, Vol 28, 1982, pp. 653-670 and Elizabeth Hoffman and Matthew Spitzer, "Entitlements, Rights and Fairness: An Experimental Examination of Subject's Concepts of Distributive Justice." *Journal of Legal Studies*, Vol 14, 1985, pp. 259-297.

Stanley provide an experimental test of pretrial bargaining in the shadow of the law.[5] Their results generally confirm the theoretical predictions previously generated.[6] In the spirit of this previous research, this paper reports an experimental test of a legal theory. Excellent reviews of the field of experimental economics can be found in two recent textbooks.[7]

Because our experiments are based on the "litigation game" and "pre-litigation game" developed in the Gilson/Mnookin article, these are summarized in the next section. For the clients themselves, Gilson/Mnookin argue that many disputes pose a prisoner's dilemma encapsulated in their finitely repeated litigation game, with an expected equilibrium of "defect/defect." In their "pre-litigation game," disputants choose lawyers who have valuable and observable reputations to represent them in the dispute. These choices are revealed and any client who has chosen a cooperative lawyer and is facing a noncooperative one may change her decision. Under the assumptions of the prelitigation game, because a lawyer's reputation for cooperation serves as a bond to the client's cooperation in the litigation process, Gilson/Mnookin suggest that the equilibrium changes to full cooperation.

Section III describes our experimental implementation of the Gilson/Mnookin model. The experiment involved two different treatments of a finitely repeated prisoner's dilemma game, one with the prelitigation game and one without. We derive the equilibria for our experimental games, and discuss some important experimental procedures. Section IV presents the results. We find that significantly more cooperative agents are chosen (and cooperative moves made) with the prelitigation game than without it. These results are also compared with slightly different earlier prisoner dilemma experiments. Section V is a brief conclusion.

II. The Gilson/Mnookin Model

A. The Litigation Game.

Gilson/Mnookin argue that the prisoner's dilemma provides a useful heuristic to illuminate a common characteristic of litigation. They argue that "[i]n many disputes, each litigant may feel compelled to make a contentious move either to exploit, or to avoid exploitation by the other side. Yet, the combination of contentious moves by both results in a less efficient outcome than if the

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[5]Don Coursey and Linda Stanley, "Pretrial Bargaining Behavior within the Shadow of the Law." *International Review of Law and Economics*, Vol 8, 1988, pp.161-179.

[6]Particularly in R. Mnookin and L Kornhauser, "Bargaining in the Shadow of the Law: The Case of Divorce." *Yale Law Journal*, 1979, 950 and R. Cooter, S. Marks and R. Mnookin, "Bargaining in the Shadow of the Law: A Testable Model of Strategic Behavior," *Journal of Legal Studies*, 1982, vol. 11.

[7]Douglas Davis and Charles Holt, *Experimental Economics*, Princeton University Press, 1991 and John Kagel and Alvin Roth (eds.), *The Handbook of Experimental Economics*, Princeton University Press, 1995.

litigants had been able to cooperate."[8]

Gilson/Mnookin model this aspect of litigation by describing initially a "litigation game" in which there are two parties and a judge, and the dispute concerns the proper division of $100 according to some legal standard. Each party has information not known to the other, some favorable and some unfavorable. Before the judge decides the case, there is a one-stage simultaneous disclosure process in which each litigant hands the judge and the other side a sealed envelope containing information. Only two moves are possible. A party can **cooperate** by voluntarily disclosing to the other side (and to the judge) all material information in her possession or **defect**, "which involves adversarial use of disclosure process to hide unfavorable information."[9] The consequence of defection is that the other side must spend $15 to force disclosure of some but not all of the withheld information. The payoff matrix takes the familiar form of a Prisoner's Dilemma.[10]

Gilson/Mnookin argue that a Prisoner's Dilemma is an appropriate model for much but not all litigation.[11] They suggest that a single lawsuit can be seen as consisting of a number of strategic encounters and can be thought of as akin to a finite repetition of the prisoner's dilemma game. The unique equilibrium of the finitely repeated game involves defection throughout.[12]

B. The Pre-Litigation Game

Gilson/Mnookin go on to suggest that introducing lawyers with reputations into the client's prisoner's dilemma model of litigation might, under some circumstances, lead to a more efficient outcome by promoting cooperation. They illustrate this possibility by creating a "prelitigation game" in which clients choose lawyers. It is then the lawyers who go on to play the litigation game

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[8]Id at 514.

[9]Id. at 514-15.

[10]Id. at 515. If both sides cooperate, the judge splits the $100 equally ($50/$50). If both defect, each party receives $35, the same $50 in judgment minus $15 spent to disclose information. If one player cooperates and the other defects, the judge awards the defector $70 and the sucker only $30 because not all of the defectors unfavorable information is revealed to the judge. The sucker thus has a *net* recovery of only $15. The defector receives $70.

[11]We will not repeat here the justifications provided in the article for the use of the Prisoner's Dilemma to model litigation. See id. at 516-520; 534-37. The article discusses at some length the extent to which the evidence of existing institutional patterns is consistent with the various assumptions underlying the "litigation game" and "pre-litigation game."

[12]Gilson/Mnookin at 520-522. There has been experimental and theoretical work from many different disciplines using the finitely repeated prisoner's dilemma game, originally attributed to A.W. Tucker. Similarities between previous experimental research and our results are addressed below.

for the clients.

Among the lawyers that a client may choose are a class of practitioners "who have a reputations for cooperation which assure that, once retained, they will conduct the litigation in a cooperative fashion."[13] In the prelitigation game, clients must disclose their choice of lawyers, and it is assumed that each side will know prior to the beginning of the litigation game whether the other side has chosen a cooperative lawyer. In the prelitigation game, if one client chooses a cooperative lawyer (known only to cooperate in litigation) and her opponent does not, then only the client originally choosing a cooperative lawyer can alter her choice of attorney. Thereafter, the litigation game then begins, each client being represented by their own lawyer and no further changes in lawyers allowed. In other words, after the litigation game begins, clients cannot change lawyers.

When there are only two types of lawyers to choose between (cooperative and gladiatorial), the prelitigation game has a weakly dominant strategy of always choosing a cooperative lawyer . By choosing cooperative attorneys who will not defect in the litigation game -- because doing so will destroy their valued reputation -- clients are able to avoid the inefficient outcome of what would otherwise be a Prisoner's Dilemma game. In other words, a lawyer's reputation for cooperation serves as a bond to insure the client's cooperation.

Another way to understand the result is to see that lawyers, acting as agents, can extend the finitely repeated Prisoner's Dilemma game and thus change the equilibrium. The extension achieved through the prelitigation game relies on the notion of lawyers having *reputations* for cooperation that are publicly known.[14]

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[13]Gilson/Mnookin at 522. The article develops in some detail the reasons one might expect there would be a supply of as well as demand for cooperative lawyers, id. 522-527, as well as the various agency problems that might subvert cooperation. Id. at 527-34.

[14]Two other models use the technique of extending a finitely repeated prisoners' dilemma game to induce cooperation. Hirshleifer and Rasmusen ("Cooperation in a Repeated prisoners' Dilemma with Ostracism," *Journal of Economic Behavior and Organization*, 1989, Vol 12, pp. 87-106) present a model of an n-person finitely repeated prisoner's dilemma with ostracism (banishment) in which cooperation is sustainable. This model has some similarities to the lawyer's viewpoint in the prelitigation game described in Gilson/Mnookin. There, noncooperative lawyers are not hired (and thus effectively ostracized), sustaining the population of cooperative lawyers. In a different extension Lapson ("Cooperation by Indirect Revelation Through Strategic Behavior," *International Journal of Game Theory*, 1994, vol 23, pp. 65-74.) extends the one-stage prisoner's dilemma game to a two-stage game to induce cooperation. Two distinctions between this extension and that of Gilson/Mnookin are worth noting. First, Lapson's model takes a single-shot game and extends it to a two-stage single shot game, while Gilson/Mnookin take a finitely repeated game and extend it an additional stage. Second, Lapson's extension occurs at the end of the prisoner's dilemma game, while Gilson/Mnookin's is at the beginning.

III. Experimental Implementation

A. The Games and Equilibria

The Gilson/Mnookin model predicts that there will be more cooperation with the prelitigation game than without it. The experiment designed to test this prediction involves two treatments of a finitely repeated prisoner's dilemma, one with and one without the prelitigation game.

In both treatments, subjects are shown a standard prisoner's dilemma matrix (Figure 1) and asked to choose an agent to play this game ten times in a row for them (to represent them in a lawsuit). Agent A (the cooperative lawyer) always plays A (the cooperative move) in the matrix below. Agent B (the gladiator lawyer) always plays B (the noncooperative move) in the matrix below. The experiment used to test this model introduces a third sort of lawyer, who is a mix between the two; the gladiator lawyer remains weakly dominant. Agent C (the lawyer without a reputation) will play any specified combination of A and B in periods 1 through 10. For simplicity, Agent C choices are assumed to be strict mixtures of moves A and B (subjects choosing Agent C and specifying all A moves are treated as having chosen Agent A).

Figure 1
The Prisoner's Dilemma Matrix

		Player 2	
		A	B
Player 1	A	50¢,50¢	10¢,70¢
	B	70¢,10¢	30¢,30¢

In the treatment without the prelitigation game, subjects choose lawyers who then go on to represent them. In this game, the dominant strategy equilibrium is to choose a gladiator lawyer (Agent B).[15]

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[15]Assume your counterpart chooses Agent A. If you choose Agent A you will earn $5 in the upcoming game. If you choose Agent B you will earn $7 in the upcoming game. If you choose Agent C you will earn somewhere strictly between $5 and $7 in the upcoming game (depending upon exactly what mix of moves you use). Since you earn at least as much by choosing Agent B than any other agent, Agent B is your best response in this case. Now assume your counterpart chooses Agent B. Choosing Agent A earns you $1 while choosing Agent B earns you $3. Again, Agent C earns you some amount between $1 and $3. Again,

In the treatment with the prelitigation game subjects choose a lawyer and are then matched. Any subject who chooses a cooperative lawyer (Agent A) and faces a lawyer who is not cooperative (Agents B or C) is given the option to change his choice. This two stage game is depicted in Figure 2, below. The single numbers in the matrix of Figure 2 refer to the trees in the second panel. Notice that the payoffs when one player chooses Agent C are described as ranges rather than values. The exact value will depend upon what mixture the subject chooses.[16]

Figure 2
The Prelitigation Game

		Player 2		
		Agent A	Agent B	Agent C
	Agent A	\$5, \$5	1	2
Player 1	Agent B	1	\$3, \$3	\$3.40-\$6.60, \$2.80-\$1.20
	Agent C	2	\$1.20-\$2.80, \$6.60-\$3.40	\$1.60-\$6.40, \$6.40-\$1.60

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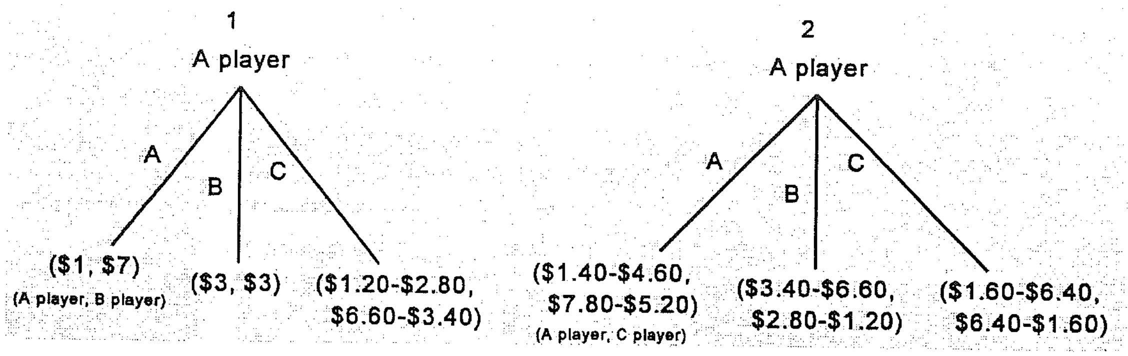
your best response is to choose Agent B in this case as well. Agent C is a combination of Agents A and B, thus Agent B is also a best response when your counterpart chooses Agent C. Since Agent B is your best response no matter what your counterpart chooses in the upcoming game, Agent B is a dominant strategy. Having both players choose Agent B is the only equilibrium of this game.

[16]For example, assume one player chooses Agent B while the other chooses Agent C. How much could each of them earn? If the Agent C player specifies the most cooperative moves possible (9 A moves and 1 B move), she will earn \$1.20 while the Agent B player will earn \$6.60. If the Agent C player specifies the least cooperative moves possible (9 B moves and 1 A move), she will earn \$2.80 while the Agent B player will earn \$3.40. As the Agent C player moves from more cooperative moves to less cooperative moves her payoff rises wile Agent B's payoff falls. Other ranges of payoffs in this and future figures were constructed in a similar manner. Strictly speaking, a matrix which completely described this game would include agents c_1, c_2, ... c_n where n is the total number of possible combinations of moves A or B over 10 periods. However, all these moves will be dominated, thus for expositional simplicity we here combine those strategies into a single one, C.



This game has a pareto-optimal Nash equilibrium of always choosing Agent A, (cooperate throughout). In this equilibrium both players choose Agent A (neither has the opportunity to switch) and both earn $5. To see that this is an equilibrium we show no player can be made better off by playing some other move.[17] This game also has a (weak) Nash equilibrium of always choosing Agent B. To see that this is also an equilibrium we refer to Figure 3, below. The payoffs in Figure 3 were calculated by folding back the trees in Figure 2 and placing the end-payoffs into the original matrix.

[17]Consider a player choosing Agent B instead. We go to tree 1 and see that the A player (his counterpart) will have an opportunity to change his agent. If he keeps his choice at Agent A he will earn $1. If he changes his choice to Agent B he will earn $3. If he changes his choice to Agent C he will earn anywhere between $1.20 and $2.80, depending on what sequence of moves he chooses. Choosing Agent B is his best response. Now both players are using Agent B, so the payoff from this original Agent B choice is $3. Choosing Agent A initially earned $5, thus if the other player is choosing Agent A, you prefer choosing Agent A to Agent B. What about Agent C? Consider a player choosing Agent C instead of Agent A. We go to tree 2 and see that the A player (his counterpart) will again have an opportunity to change his agent. If he keeps his choice at Agent A he will earn anywhere between $1.40 and $4.60, depending on the particular moves the C player specified for his agent. If he changes his choice to Agent B he will earn anywhere between $3.40 and $6.60. If he changes his choice to Agent C he will earn anywhere between $1.60 and $6.40, depending on what sequence of moves he chooses. Again, choosing Agent B is his best response. Now the original player is using Agent C and the other player is using Agent B. The payoff to the original player from this combination of strategies is anywhere between $1.20 and $2.80. Choosing Agent A initially earned $5, thus if the other player is choosing Agent A, you prefer choosing Agent A to Agent C.

Figure 3
Reduced Form Matrix

		Player 2		
		Agent A	Agent B	Agent C
	Agent A	\$5, \$5	\$3, \$3	\$3.40-\$6.60, \$2.80-\$1.20
Player 1	Agent B	\$3, \$3	\$3, \$3	\$3.40-\$6.60, \$2.80-\$1.20
	Agent C	\$1.20-\$2.80, \$6.60-\$3.40	\$1.20-\$2.80, \$6.60-\$3.40	\$1.60-\$6.40, \$6.40-\$1.60

Both players choosing Agent A in the matrix above is a Nash equilibrium of this game, as shown in the previous footnote. However, both players choosing Agent B is also an equilibrium. If both players do it, neither wants to deviate.[18] This equilibrium is less attractive than the Agent A equilibrium for two reasons. First, it is a pareto inferior equilibrium. Second and most importantly, it involves playing a weakly dominated strategy (choosing Agent B). Thus this equilibrium does not survive any equilibrium refinements (e.g. trembling-hand perfection). Interestingly enough, playing Agent C with any distribution of moves is not an equilibrium. Agent B strictly dominates Agent C.

As one seminar participant pointed out, there is a sense in which the prelitigation game might result in *less* cooperation than the litigation game.[19] If we hold initial choices of agents constant, the prelitigation game gives players an opportunity to switch away from their initial choice of Agent A; an opportunity they would not have had in the litigation game. If, for example, three out of five players choose Agent A in the litigation game, pairing each player with each other player yields approximately 11% (A, A) pairs, 54% (A, B) pairs and 35% (B, B) pairs.

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[18]Consider a player choosing Agent A instead. He will then have an opportunity to change, and his best response implies changing his choice back to Agent B. Thus the player is no better off having changed his choice. Consider a player choosing Agent C instead. He will not have an opportunity to change his choice (he hasn't chosen a cooperative agent), thus he will earn anywhere between \$1.20 and \$2.40, depending on which mixture of A and B moves he specifies. However, this is strictly less than the \$3 he would have earned had he remained with Agent B. Thus if both players choose Agent B, neither has an incentive to change his move.

[19]The authors thank Brian Lambert for bringing this point to their attention. The following analysis ignores possible choices of Agent C altogether.

example, three out of five players choose Agent A in the litigation game, pairing each player with each other player yields approximately 11% (A, A) pairs, 54% (A, B) pairs and 35% (B, B) pairs. If players chose the same agents initially in the prelitigation game, and then everyone who had the opportunity to switch actually switched to Agent B, the mix would become approximately 11% (A, A) pairs and 89% (B, B) pairs (since all the Agent A players previously stuck in the (A, B) pairs would change their representation to Agent B). The claim that the prelitigation game implements more rather than less cooperation relies on enough subjects changing their initial choices from Agent B to Agent A in the prelitigation game, as the equilibria predict.[20]

As in the Gilson/Mnookin paper, the unique Nash equilibrium of the litigation game involves both players choosing a gladiator lawyer (Agent B). There are two Nash equilibria of the prelitigation game, both players choosing a cooperative lawyer (Agent A) and both choosing a gladiator lawyer (Agent B). However, the Agent A equilibrium pareto-dominates the Agent B equilibrium, and is the only one to survive refinements.

B. Experimental Implementation

Subjects in the experiment were all students at Harvard Law School. Subjects were recruited in their classrooms and the experiment took place in the same rooms. Forty subjects participated in the litigation game (baseline) treatment and 46 in the prelitigation game treatment.

Copies of the instructions were distributed to the subjects, placed on an overhead projector and read aloud to ensure common information. Since the game is symmetric, all subjects were told to imagine they were the row player in the game. Each subject chose one of three strategies (attorneys) after which their response forms were collected.

In the baseline treatment subjects moves were matched up and earnings calculated while they completed a post-experimental questionnaire. Earnings were placed into envelopes, labeled with subject numbers rather than names, which subjects picked up as they left the classroom. Instructions and experimental materials can be found in Appendix A.

In the prelitigation game treatment subjects were matched up as well. All subjects then received a second sheet of paper. If another move was required of them they responded on the sheet, if not, their sheet simply told them to return it to the monitor. All sheets handed out at this stage were picked up as well, thus no subject could tell whether or if another subject had a

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[20]If the prelitigation game involves only slightly more players choosing Agent A than the litigation game, the end result will be more defection rather than less. Brian Lambert writes "[A]s the percentage of B players grows, the costs of allowing A players to switch in round two may overcome the benefits of the model's incentives to 'try A.' In particular, if there is a 25% B population, then the . . . prelitigation game and the [litigation] game are almost indistinguishable in their results."

secondary move to make. Earnings were then calculated, placed in envelopes and picked up by the subjects, as before, after they had completed their post-experimental questionnaire. No show-up fee was paid, although all subjects were paid their earnings in the game.

IV. Experimental Results

A. Raw Data

Table 1 summarizes the raw data from the experiment.[21]

Table 1
Raw Results

	Agent Choice A	Agent Choice B	Agent Choice C
Litigation Game n=40	7	17	16
Prelitigation Game n=46	35	6	5

B. Analysis

The main results from this experiment support the theory offered by Gilson/Mnookin: significantly more cooperative agents are chosen with the prelitigation game than without. Table 2 shows the percentage of cooperative agents chosen in each treatment and reports the significance test.[22]

[21]Two C-choosers in the normal game chose all one move (one chose all A and one chose all B). This analysis counts those choices as A or B choices.

[22]The significance test used here is the t-test of proportions. Two proportions are considered different from each other if their t-statistic is significant, where p_i is the proportion of successes in treatment i, n_i is the number of observations and t is calculated:

$$t = \frac{p_1 - p_2}{\sqrt{\frac{p_1(1-p_1)}{n_1} + \frac{p_2(1-p_2)}{n_2}}}$$

Table 2
Percent Choices of Cooperative Agent (Agent A)

	Percentage	T-test of Proportions	Significance Level
Litigation Game n=40	17.5%	6.738	0.000
Prelitigation Game n=46	76.1%		

Another measure which may be of interest is the number of cooperative *moves* made by the subjects. This differs from the choice of cooperative agents only in that some individuals chose Agent C whose actions included some mix of cooperative and noncooperative moves. The two treatments were again significantly different in the correct direction for this measure of cooperativeness as well, as shown in Table 3.[23]

Table 3
Percent Cooperative Moves Made (A)

	Percentage	T-test of Proportions	Significance Level
Litigation Game n=400	39.0%	13.522	0.000
Prelitigation Game n=460	80.4%		

One final question which the data can address involves changes actually made in the prelitigation game. As can be seen in Figure 2, if a player is given an opportunity to change his choice, his dominant strategy is to change to Agent B. In the prelitigation game treatment of the experiment nine subjects were in a position to change their choices. Of those, 6 switched to Agent

[23]There are some statistical problems with this measure. The t-test of proportions assumes independent data, which is not observed when individual moves are being analyzed (since one subject generates 10 observations). The difference between the treatments is so significant, however, that this technicality is overlooked here.

B (the dominant strategy), while three switched to Agent C. None remained with Agent A.[24]

The results of this experiment strongly supported the predictions of Gilson/Mnookin. Subjects in the prelitigation game chose significantly more cooperative lawyers than did subjects in the litigation game, as predicted.

C. Comparison with Previous Experiments

The litigation game treatment of this experiment provides an interesting comparison with other repeated prisoner's dilemma experiments.[25] In most previous experiments, subjects are told their counterpart's move, and their earnings, in round n before having to make their decisions in round n+1. Thus reactive strategies (like tit-for-tat and trigger strategies) are feasible. In the litigation game treatment of this experiment, subjects specified all ten moves in advance; thus no reactive strategies were permitted. Are the results of this experiment similar to those observed under reactive conditions?

The answer is generally yes, with some caveats. Comparing data across experiments is always a delicate operation. Though all the experiments discussed in this section used a finitely repeated prisoner's dilemma, the exact payoffs in each cell varied from experiment to experiment. Experimental procedures like instructions, compensation, anonymity, ... all varied as well.

In one of the original prisoner's dilemma experimental papers Lester Lave ran 19 pairs of subjects through a prisoner's dilemma 100 times.[26] The payoffs when both subjects cooperated was positive, although the "sucker" payoff (the payoff a player earns when he cooperates and his counterpart defects) and the payoff to subjects when they both defected, were as negative. Subjects were paired, given some money so they wouldn't owe the experimenter anything, played the game 100 times and took home their earnings. Data from this experiment is in the form of a graph, reproduced here, which depicts the percentage of cooperative moves for each of the 100 periods.

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[24]Of the three players who switched to C, one chose five A moves and five B moves, one chose four A moves and six B moves and the last chose six A moves and four B moves.

[25]Anatol Rapoport and Albert Chammah's 1965 book *Prisoner's Dilemma* (University of Michigan Press) provide a historical review of Prisoner's Dilemma experiments in experimental psychology. Robyn Dawes and Richard Thaler provide a more recent discussion of cooperation more generally ("Anomalies: Cooperation," *Journal of Economic Perspectives*, 1988, vol. 2, pp. 187-197).

[26]See Lester Lave, "An Empirical Approach to the Prisoners' Dilemma Game," *Quarterly Journal of Economics*, 1962, vol. 76, pp. 424-436.

PRISONERS' DILEMMA GAME 431

Players Co-operating in the Prisoners' Dilemma: First Series

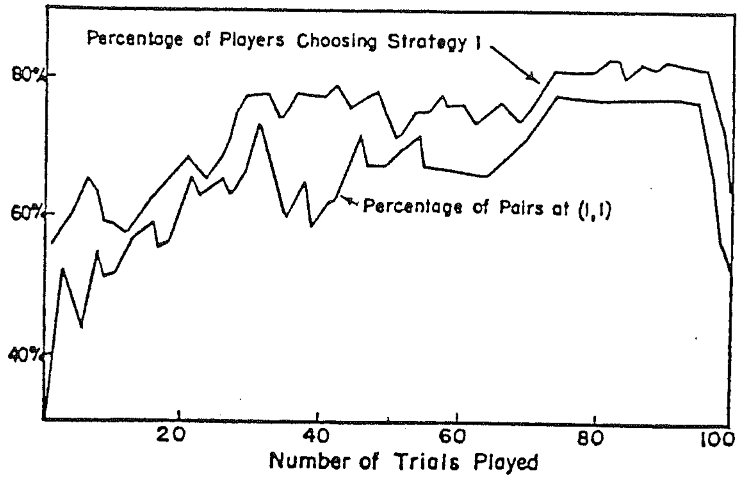

FIGURE VI

The percentage of cooperative moves varies over the course of the game, from just under 60% in the first period to just above 60% in the last. Overall, the level of cooperation is higher than we observed in the litigation game in this paper (39%).

In the Rapoport and Chammah book they report an experiment of theirs in which 70 pairs of subjects were matched and played the prisoner's dilemma 300 times. They tested games of varying levels of payoffs, while retaining the prisoner's dilemma structure. As in the Lave experiments, payoffs from both players defecting and the sucker's payoff were negative. However, subjects in this experiment did not keep the money they earned in the game, but were instead given a flat participation fee. Rapoport and Chammah report cooperation rates varying from 27% to 77%, based on the particular payoff configuration.

In possibly the most comparable experiment to ours, L. G. Morehous ran (among other games) a 10-round finitely repeated prisoner's dilemma experiment.[27] (The increased comparability comes from the similarities of the lengths of the games.) Ninety-six pairs of undergraduate students participated in the experiment. They were paid based on their moves. Again, payoffs to joint defection as well as the sucker's payoff were negative, while payoffs to joint cooperation were positive. Morehous found 42% of subjects made cooperative moves in the 10-period repeated game.

Finally, in a more modern treatment of the finitely repeated Prisoner's Dilemma, James Andreoni and John Miller report an experiment in which 14 subjects play a series of 20 ten-round

[27]See L.G. Morehous, "One-play, two-play, five-play and ten-play runs of Prisoner's Dilemma," *Conflict Resolution*, 1966, vol X(3), pp. 354-362.

games.[28] Subjects are paid their earnings and all payoffs in the matrix are non-negative. They find that within each set of ten games, subjects cooperate substantially more in the early rounds than in the later ones. Average cooperation rates start at just over 60% and decrease through the course of the game to end under 10%, with the decrease being relatively monotonic.[29] Averaged over all periods, subjects make xxx% of cooperative moves.

The experimental results from the litigation game are quite similar to those of previously-run ten-round repeated prisoner's dilemma games. Our subjects made 39% of their moves cooperatively, while Morehous' subjects cooperated 42% of the time and Andreoni and Miller's, xxx% of the time. Varying levels of cooperation were found by Lave and Rapoport and Chammah when the game was repeated hundreds of times.

V. Conclusions

This paper presents an experimental test of a Gilson/Mnookin model in which the choice of lawyer facilitate client cooperation in lawsuits. Litigation without lawyers is modeled as a finitely repeated prisoner's dilemma. Litigation with lawyers involves a prelitigation game in which, with no risk, a client can initially choose a cooperative lawyer, and thus signal a willingness to cooperate. In the Gilson/Mnookin model, the addition of this prelitigation stage changes the equilibrium from defection to cooperation. The results of the experiment suggest that extending the game in this way actually does increase cooperation significantly.

The Gilson/Mnookin article suggested that lawyers develop reputations, and that the reputation for being cooperative problem-solvers can be a valuable asset. They argue that "the relationship between opposing lawyers and their capacity to establish a credible reputation for cooperation have profound implications for dispute resolution."[30] The experiment described in this article obviously tests only a small, but important piece of their much more complicated, and institutionally elaborate argument. Nevertheless, the results of our experiment do suggest that self-interested clients would frequently choose cooperative lawyers if they could be confident that either (1) the other side would do the same or (2) if the other side did not, they could switch their representation. It also suggests that the existence of cooperative lawyers with recognizable reputations may well support more cooperative client behavior.

In conclusion, two important but obvious points bear emphasis. First, as Gilson/Mnookin

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[28]See James Andreoni and John Miller, "Rational Cooperation in the Finitely Repeated Prisoner's Dilemma: Experimental Evidence," *Economic Journal*, 1993, vol. 103, pp. 570-585.

[29]We use the Partners treatment for comparison.

[30]*Id.* at 564.

In conclusion, two important but obvious points bear emphasis. First, as Gilson/Mnookin themselves point out, the real world of litigation is much more complicated than their model. They suggest that not all litigation has a payoff structure consistent with a Prisoner's Dilemma Game. Moreover, the assumptions of the pre-litigation game (and the rules governing our experiment) are demanding: reputations are known in advance, and stable; a client can costlessly switch from a cooperative attorney to a gladiator if the other side fails to choose a cooperative attorney; and no changes in attorneys are permitted once the litigation game begins.

The realism or appropriateness of these (demanding) assumptions are not tested in the experiment presented in this paper. Rather, the experiment provides a test of the *implications* of these assumptions. If all these conditions are met, is the outcome we observe the outcome we expect; more cooperation? The answer from this experiment is a conclusive yes.

The second point is equally obvious but also important. To the extent there are real world institutions that facilitate and promote the efficiency of reputational markets, it would seem cooperation might well be enhanced. These results pose an interesting question -- well beyond the scope of this paper -- about what institutional arrangements might best support and promote the existence of reputational markets.

Other sorts of research -- empirical rather than experimental -- might usefully explore the complex set of puzzles concerning how reputations are developed and are sustained, and how lawyers actually cooperate in the litigation process.

Appendix A
Experimental Instructions

Player ID ______________

Name ____

Year ______________

Gender M F

Welcome! Today you and a randomly assigned counterpart have an opportunity to earn some money.

In this exercise you and a counterpart will be choosing an agent to make moves for you in a two-person game. Once your choice has been made, you and your counterpart's earnings will be calculated and paid to you. At no time will you know your counterpart's identity, nor will he ever know yours. All your choices in this exercise are completely anonymous. To preserve this anonymity, we ask you not to communicate with any other person in the classroom until the exercise is over.

The agents you and your counterpart choose will be making moves from the matrix below. Your agent can make move A or B (by choosing the top or bottom column). Your counterpart's agent can also make move A or B (by choosing the left or right row). The combination of their chosen moves determines your earnings. Earnings for you and then for your counterpart are given in the matrix. For example, if your agent makes move A and your counterpart's agent makes move B then you earn 10¢ (the first number) and your counterpart earns 70¢ (the second number).

Your agent's move	Your counterpart's agent's move: A	Your counterpart's agent's move: B
A	50¢, 50¢	10¢, 70¢
B	70¢, 10¢	30¢, 30¢

To be sure you understand the matrix, please fill in the blanks below:

If my agent makes move A and my counterpart's agent makes move A
then I earn ____¢ and my counterpart earns ____¢ .

If my agent makes move B and my counterpart's agent makes move A
then I earn ____¢ and my counterpart earns ____¢ .

If my agent makes move A and my counterpart's agent makes move B
then I earn ____¢ and my counterpart earns ____¢ .

If my agent makes move B and my counterpart's agent makes move B
then I earn ____¢ and my counterpart earns ____¢ .

In this exercise the agents you and your counterpart choose will play this game 10 times. There are three different types of agents you can choose described on the next page. After the agents have been chosen we will collect the information, match your agent's 10 moves and your counterpart's agent's 10 moves and calculate your earnings. You will be paid earnings from the game in cash at the end of the game today. The next page has a list of the types of agents and a place to specify your choice. If you have any questions please raise your hand and I will answer them. If not, please turn to the next page.

On this sheet you will choose your agent out of the three types available. Your agent will make the moves specified by his type for the 10 plays of the game described on page 1 of the instructions. You will receive the money your agent has made as a result of these moves. To make your choice you will circle an agent type A, B or C below. These are your only choices of agents.

Agent A: Plays A all 10 times

Agent B: Plays B all 10 times

Agent C: Follows your instructions exactly. You tell agent C which moves he should make in each round of the game and he makes them. If your choice of agent is agent C you must specify the moves he is to make throughout the game. Please do so by circling the moves below.

Round 1: A B

Round 2: A B

Round 3: A B

Round 4: A B

Round 5: A B

Round 6: A B

Round 7: A B

Round 8: A B

Round 9: A B

Round 10: A B

When you have made your choice and filled out this sheet, fold it in half and hold it in the air until a monitor comes to collect it. Thank you for participating in this exercise. You will receive your earnings shortly.

Player ID ______________

Name ____

Year ______________

Gender M F

Welcome! Today you and a randomly assigned counterpart have an opportunity to earn some money.

In this exercise you and a counterpart will be choosing an agent to make moves for you in a two-person game. Once your final choice has been made, you and your counterpart's earnings will be calculated and paid to you. At no time will you know your counterpart's identity, nor will he ever know yours. All your choices in this exercise are completely anonymous. To preserve this anonymity, we ask you not to communicate with any other person in the classroom until the exercise is over.

The agents you and your counterpart choose will be making moves from the matrix below. Your agent can make move A or B (by choosing the top or bottom column). Your counterpart's agent can also make move A or B (by choosing the left or right row). The combination of their chosen moves determines your earnings. Earnings for you and then for your counterpart are given in the matrix. For example, if your agent makes move A and your counterpart's agent makes move B then you earn 10¢ (the first number) and your counterpart earns 70¢ (the second number).

		Your counterpart's agent's move	
		A	B
Your agent's move	A	50¢, 50¢	10¢, 70¢
	B	70¢, 10¢	30¢, 30¢

To be sure you understand the matrix, please fill in the blanks below:

If my agent makes move A and my counterpart's agent makes move A
then I earn ____¢ and my counterpart earns ____¢ .

If my agent makes move B and my counterpart's agent makes move A
then I earn ____¢ and my counterpart earns ____¢ .

If my agent makes move A and my counterpart's agent makes move B
then I earn ____¢ and my counterpart earns ____¢ .

If my agent makes move B and my counterpart's agent makes move B
then I earn ____¢ and my counterpart earns ____¢ .

In this exercise the agents you and your counterpart choose will play this game 10 times. There are three different types of agents you can choose described on the next page. After the agents have been chosen we will collect the information, and match your and your counterpart's agent choice. At this stage you may be allowed to switch your choice of agent or your counterpart may be allowed to switch. Once the choice of agents is final your agent's 10 moves and your counterpart's agent's 10 moves will be matched and the game played. You will be paid earnings from the game in cash at the end of class today. The next page has a list of the types of agents and the conditions under which switching of agents is allowed as well as a place to specify your initial agent choice. If you have any questions please raise your hand and someone will be around to answer them. If not, please turn to the next page.

On this sheet you will initially choose your agent out of the three types available. Your agent will make the moves specified by his type for the 10 plays of the game described on page 1 of the instructions. You will receive the money your agent has made as a result of these moves. To make your choice you will circle an agent type A, B or C below. These are your only choices of agents.

If you choose Agent A and your counterpart does not you will be given the opportunity to switch your choice of agents. If your counterpart chooses Agent A and you do not, he will be given a similar opportunity. Please make your initial choice of agents now.

Agent A: Plays A all 10 times

Agent B: Plays B all 10 times

Agent C: Follows your instructions exactly. You tell Agent C which moves he should make in each round of the game and he makes them. If your choice of agent is Agent C you must specify the moves he is to make throughout the game. Please do so by circling the moves below.

Round 1:	A	B
Round 2:	A	B
Round 3:	A	B
Round 4:	A	B
Round 5:	A	B
Round 6:	A	B
Round 7:	A	B
Round 8:	A	B
Round 9:	A	B
Round 10:	A	B

When you have made your choice and filled out this sheet, fold it in half and hold it in the air until a monitor comes to collect it. If you have chosen Agent A and your counterpart has not you will be informed and given an opportunity to change your choice of agents. Otherwise we will match your choice and your counterpart's choice to calculate your earnings.

Either you have not chosen Agent A or you have chosen Agent A and your counterpart has chosen Agent A as well. You will not be given the opportunity to alter your choice of agents.

Please fold this sheet in half and hold it in the air until a monitor comes to collect it.

Thank you for participating in this exercise. You will receive your earnings shortly.

You have chosen Agent A and your counterpart has not. You will now be given the opportunity to alter your choice of agents. Please choose again from the list below.

Agent A: Plays A all 10 times

Agent B: Plays B all 10 times

Agent C: Follows your instructions exactly. You tell Agent C which moves he should make in each round of the game and he makes them. If your choice of agent is Agent C you must specify the moves he is to make throughout the game. Please do so by circling the moves below.

Round 1:	A	B
Round 2:	A	B
Round 3:	A	B
Round 4:	A	B
Round 5:	A	B
Round 6:	A	B
Round 7:	A	B
Round 8:	A	B
Round 9:	A	B
Round 10:	A	B

When you have made your final choice and filled out this sheet, fold it in half and hold it in the air until a monitor comes to collect it. This will be your final opportunity to choose your agent. We will now match your choice and your counterpart's choice to calculate your earnings.

Thank you for participating in this exercise. You will receive your earnings shortly.