When Ignorance is Bliss:
Information, Fairness, and Bargaining Efficiency

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Abstract

Most theories of legal discovery assume that sharing information among disputing parties will lead to convergence of expectations and will facilitate settlement. However, psychological research shows that shared information, if it is open to multiple interpretations, is likely to be interpreted egocentrically by the disputants, which can cause beliefs to diverge rather than converge. We present results from a bargaining experiment which shows that information sharing leads to divergence of expectations, and to settlement delays, when the information exchanged is amenable to multiple interpretations. By contrast, when there is only one obvious interpretation, information sharing leads to convergence of expectations and speeds settlement. We show, further, that information sharing moderates the relationship between size of the bargaining zone and the prospects for settlement.

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I. INTRODUCTION

Much of what modern litigators do revolves around collecting information from witnesses or from the other parties to the case. The heart of most legal cases involves the acquisition and sharing of information, including often lengthy discovery during which the parties exchange documents, examine relevant witnesses and question each other using formal interrogatories. Indeed, a whole section of the Federal Rules of Civil Procedure—rules 26 to 37—is devoted exclusively to this discovery process. Federal Magistrates are appointed to deal with the frequent disputes that arise during discovery, and the bulk of modern civil litigators' time is spent on this process. The dramatic television portrayal of a trial with surprise witnesses is inconsistent with modern civil litigation; even surprise statements are rare.

Part of the motivation for compelling litigators to exchange so much information is the assumption that information sharing will promote settlement. This assumption is premised on two subsidiary beliefs: (1) that information exchange will result in convergent estimates of the likely outcome of the case, and (2) that such convergence will facilitate settlement.[1] In this paper we question both of these premises, and present results from an experiment suggesting that there are at least some situations in which they cannot be assumed to be true.[2]

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[1] As Richard A. Posner (1986:525) writes in *Economic Analysis of Law* (3rd ed. Little, Brown 1986), "a full exchange of information…is likely to facilitate settlement by enabling each party to form a more accurate, and generally therefore a more convergent, estimate of the likely outcome of the case."

[2] There are other reasons to doubt that information sharing necessarily increases settlement. Gathering and sharing information is often costly, and the desire to avoid incurring such costs provides an incentive to settle a case early in the process. To the degree that people 'chase' sunk costs, they may actually provide an incentive *against* settlement;

Challenging the first premise, our study shows that information exchange does not always result in convergence, but can result in divergence of expectations. The key to whether information exchange creates convergence or divergence of expectations is whether the interpretation of the information that is exchanged is straightforward or ambiguous. When the implications of the information are obvious and are not amenable to alternative interpretations, then the sharing of information will tend to produce convergence of expectations and facilitate settlement. However, when there is even a moderate degree of ambiguity about how information should be interpreted, each party will tend to interpret the information in a self-serving fashion, and a sharing of information will often result in a divergence of expectations.

Challenging the second premise, we show that convergence of expectations will not necessarily promote settlement, but that, again, whether it does or does not depends on other factors. When information sharing leads to converging expectations, it also reduces uncertainty about the size of the contract zone. Although it is reasonable to expect that the size of the contract zone (and the potential rewards of settlement) should be positively correlated with the probability of settlement, larger contract zones also increase the potential benefits of aggressive bargaining tactics that increase the probability of delay and impasse. We show that whether there is a positive or negative relationship between the size of the contract zone and the speed of settlement depends critically on the presence or absence of uncertainty. When parties are uncertain about the existence or location of the contract zone, then increasing the size of the contract zone promotes settlement, but when the sharing of full information makes the contract zone common information, increasing its size can actually impede settlement.

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see Samuel Issacharoff and George Loewenstein, *Unintended Consequences of Mandatory Disclosure*, 73 U. Texas L.J. 753 (1995).

In the remainder of Section I, we review literature that pertains to each of these points. Section II then describes a study that tested the two hypotheses just described, Section III presents the findings from this study, and Section IV concludes.

A. Background: Information and Expectations

Contrary to the view that the exchange of information will necessarily produce a convergence of expectations, considerable research shows that information exchange often has the opposite result. In a classic study, Lord, Lepper, and Ross[3] exposed proponents and opponents of the death penalty to two articles presenting empirical research dealing with the deterrent effect of the death penalty. One article provided positive support for a deterrent effect and the other provided evidence against such an effect. Rather than moderating their views after reading the articles, both sides ended up with more extreme beliefs than they started out with about the deterrent value of the death penalty. Further analyses showed that subjects denigrated the methodology employed in the article that conflicted with their preexisting views and hence downplayed the significance of those findings.

Similar biases have been found in people's judgments of fairness. Messick and Sentis[4] conducted an experiment in which some subjects were asked to imagine that they had worked seven hours at a task and that another person had worked ten hours at the same task. Other subjects were asked to imagine that they had worked ten hours and the other person had worked seven hours. In each case, the experimenter specified that the person who had worked seven hours would be paid $25; the question was how much to pay the person who had worked ten

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[3] Charles G. Lord, Lee Ross, and Mark R. Lepper, *Biased Assimilation and Attitude Polarization*, 37 J. Pers. Soc. Psychol. 2098 (1979).

[4] David M. Messick and Keith P. Sentis, *Fairness and Preference*, 15 J. Exp. Soc. Psychol. 418 (1979). A doctoral student of Messick's (Van Avermaet, 1974) obtained very similar results in a study involving real payoffs. See David M. Messick and Keith P. Sentis, *Fairness, Preference, and Fairness Biases* 61-94 (David M. Messick and Karen S. Cook eds., Equity Theory: Psychological and Sociological Perspectives, Praeger 1983).

hours. On average, ten-hour subjects thought that they should be paid $35.24, but seven-hour subjects thought the person who had worked ten hours should only be paid $30.29. Closer analysis provided insight into the cause of the effect. Subjects' responses were distributed bimodally. Most subjects thought either that it was fair to pay both parties equally regardless of hours worked or that it was fair to pay both an equal hourly wage (which would mean paying the ten-hour workers approximately $35.70). The difference between the experimental conditions resulted from the fact that a greater number of seven hour subjects believed that equal total pay was fair. This research suggests that self-serving assessments of fairness are likely to occur in morally ambiguous settings in which there are multiple settlement points that could plausibly be viewed as fair.[5]

Loewenstein, Babcock, Issacharoff and Camerer examined the implications of such self-serving assessments of fairness for bargaining.[6] Subjects were randomly assigned to the role of plaintiff or defendant and negotiated the settlement of a tort case based on an actual trial in which an injured motorcyclist sued the driver of the automobile that hit him. Both subjects received the same 27 pages of materials from the original legal case and were informed that a judge had been given identical case materials and had reached a judgment between $0 and $100,000. Before negotiating, subjects were asked to write down their guess of what the judge awarded and were told they would receive a bonus of $1 at the end of the session if their prediction lay within $5,000 (plus or minus) of the judge's actual award. This estimate was not shared with the other side. The two subjects were then allowed to negotiate for 30 minutes. Delays in settlement were made costly to the subjects by imposing "court costs" that

[5] The notion of focal points was first introduced by Thomas Schelling, *The Strategy of Conflict* (Harvard University Press 1960).

[6] George Loewenstein, Samuel Issacharoff, Colin Camerer, and Linda Babcock, *Self-Serving Assessments of Fairness and Pretrial Bargaining*, 22 J. Legal Stud. 135 (1993).

accumulated in each period in which the subjects failed to settle. If they failed to reach a voluntary settlement within 30 minutes, then the judge's decision determined the defendant's payment to the plaintiff, and legal costs were levied on both parties. Pre-negotiation predictions of the judge's ruling revealed a strong self-serving bias – plaintiffs predicted the ruling would be much higher than did defendants – and the discrepancy between plaintiffs' and defendants' assessments was negatively correlated with settlement. The fact that subjects were not able to overcome the bias even though they were paid for doing so suggests that the bias is unintentional and unconscious (otherwise subjects could correct for it).

A follow-up study provided further clues about the source of the bias and also provided evidence that the relationship between nonsettlement and the magnitude of the bias is causal – that the bias causes impasse. The design of the study was virtually identical except that half of the pairs were told their roles before they read the case materials (as in the earlier study) and the other half read the materials before they were informed of their role in the negotiation. Those who read the materials without knowing their roles exhibited a much smaller bias and showed a much lower rate of impasse.[7] These findings reinforce the conclusions from the death penalty study that the self-serving bias results from a biased interpretation of evidence.[8]

Biased interpretation of evidence requires some degree of ambiguity. If the implications of a particular piece of information are perfectly obvious, then both sides are likely to interpret that information in the same way. However, if there is ambiguity in the situation that allows for

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[7] Linda Babcock, George Loewenstein, Samuel Issacharoff, and Colin Camerer, *Biased Judgments of Fairness in Bargaining*, 85 Am. Econ. Rev. 1337 (1995); Linda Babcock, George Loewenstein, and Samuel Issacharoff, *Creating Convergence: Debiasing Biased Litigants*, Law and Social Inquiry 401 (1997).

[8] This is a general conclusion of psychological research on so-called 'motivated' biases in information processing. Based on a review of numerous studies conducted by psychologists, Sanitioso, Kunda and Fong conclude that "people attempt to construct a rational justification for the conclusions that they want to draw. To that end, they search through memory for relevant information, but the search is biased in favor of information that is consistent with the desired conclusions. If they succeed in finding a preponderance of such consistent information, they are able to draw the desired conclusion while maintaining an illusion of objectivity," Rasyid Sanitioso, Ziva Kunda, and Geoffrey T. Fong, *Motivated Recruitment of Autobiographical Memories*, 59 J. Pers. Soc. Psychol. 229 (1990).

alternative interpretations, motivations and expectations will have an impact. Consistent with this logic, Thompson and Loewenstein[9] explicitly manipulated ambiguity and found that greater ambiguity was associated with larger bias. Wade-Benzoni, Tenbrunsel, and Bazerman[10] have shown that asymmetry between parties has the same effect. Asymmetry creates opportunities for differing (and self-serving) expectations and beliefs. In their study, when parties occupied symmetric positions, their expectations for settlement converged and cooperation increased. However, when parties occupied asymmetric positions, differing egocentric interpretations of fairness were more likely, and cooperation broke down.

A general conclusion from this research, as summarized by Babcock and Loewenstein[11] is that: "As soon as asymmetries are introduced between the parties—for example, different non-agreement values or costs of non-settlement, or subtle differences in roles—both parties' notions of fairness will tend to gravitate towards settlements that favor themselves. They will not only view these settlements as fair, but believe that their personal conception of fairness is impartial." Other general conclusions are that the bias is unconscious and unintentional, that both prior beliefs and desires can lead to biased information processing, and that the bias does not operate directly, but rather indirectly via the processing of information – e.g., differential weighting of evidence that supports or conflicts with the conclusion that one wants to or expects to reach.

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[9] Leigh Thompson and George Loewenstein, *Egocentric Interpretations of Fairness and Interpersonal Conflict*, 51 Organ. Behav. Hum. Decis. Process. 176 (1992).

[10] Kimberly A. Wade-Benzoni, Ann E. Tenbrunsel, and Max H. Bazerman, *Egocentric Interpretations of Fairness in Asymmetric, Environmental Social Dilemmas: Explaining Harvesting Behavior and the Role of Communciation*, 67 Organ. Behav. Hum. Decis. Process. 111 (1996).

[11] Linda Babcock and George Loewenstein, *Explaining Bargaining Impasse: The Role of Self-Serving Biases*, 11 J. Econ. Perspect. 109 (1997).

B. Convergent Expectations and Settlement

Contrary to the assumption that convergence of expectations always promotes settlement, theoretical and empirical research suggest that the relationship between convergence of expectations and rates of settlement depends on the size of the contract zone. In the presence of uncertainty, the expectations of the two parties are likely to diverge, and negotiators can easily fail to agree despite the potential for profitable settlement.[12] In such a situation, any factor that increases the costs of non-settlement for either party, such as high litigation costs, will facilitate settlement by increasing the likelihood that the parties will be able to identify a zone of agreement. Cramton[13] shows that when there is uncertainty about the other parties' reservation values, larger contract zones should reduce strategic delay, because bargainers expecting large surpluses from a negotiation are more impatient than bargainers expecting small surpluses. This means that there would be a positive relationship between size of the bargaining zone and speed of settlement under conditions of uncertainty.

On the other hand, when parties have reliable information about their opponents' reservation prices, increasing the size of the contract zone will increase the potential benefits of threats, intransigence, brinkmanship, and other aggressive bargaining tactics. In this situation, increasing the size of the bargaining zone is more likely to increase settlement delays precisely because it increases the size of the potential prize to be won. A number of theoretical and empirical analyses support these hypotheses. Crawford[14] and Bloom[15] both provide theoretical models that predict a negative relationship between settlement and the size of the contract zone

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[12] Kalyan Chatterjee and Larry Samuelson, *Bargaining with Two-Sided Incomplete Information: An Infinite Horizon Model with Alternating Offers*, 54 Rev. Econ. Stud. 175 (1987).
[13] Peter C. Cramton, *Strategic Delay in Bargaining with Two-Sided Uncertainty*, 59 Rev. Econ. Stud. 205 (1992).
[14] Vincent P. Crawford, *A Theory of Disagreement in Bargaining*, 50 Econometrica 607 (1982).
[15] David E. Bloom, Is Arbitration Really Compatible with Bargaining?, 20 Ind. Relat. 233 (1981)..

when bargainers have full information about others' reservation prices. Malouf and Roth[16] provide experimental evidence consistent with this theoretical prediction. Bargainers in their experiments negotiated over the division of a fixed number of lottery tickets. The experimenters manipulated the bargaining zone by restricting the range of permissible divisions. Because there was complete information about how the lottery tickets could be divided, there was no uncertainty about the magnitude or location of the contract zone. They found that settlement delays increased with the size of the contract zone.

Babcock, Loewenstein and Wang[17] combined these two sets of predictions and examined the joint effect of the size of the contract zone and (un)certainty about its size on settlement. As predicted, there was a strong interaction. Settlement was positively related to the size of the contract zone when parties were uncertain about one-another's reservation prices but was negatively related to the size of the contract zone when there was complete information about reservations prices. Their findings are intuitively sensible. When there is certainty, smaller contract zones limit the benefits of aggressive bargaining relative to the costs of delay. On the other hand, when there is uncertainty, larger bargaining zones provide room for settlement even when the parties reach incompatible estimates of their opponents' reservation prices.

C. Information, Expectations, and Framing

In this paper, we seek to extend our understanding of the impact of information on bargaining. We begin with the premise that self-serving assessments of fairness are a major cause of impasse in bargaining. This conclusion is consistent with the aforementioned research

[16] Michael W. Malouf and Alvin E. Roth, *Disagreement in Bargaining: An Experimental Study*, 25 J. Confl. Resolut. 329 (1981).
[17] Linda Babcock, George Loewenstein, and Xianghong Wang, *The Relationship between Uncertainty, the Contract Zone, and Efficiency in a Bargaining Experiment*, 27 J. Econ. Behav. Organ. 475 (1995).

on the self-serving bias in bargaining. In studies examining the self-serving bias, the magnitude of the bias was an extremely strong predictor of impasse, and two different manipulations that eliminated the bias led to close to 100 percent settlement compared to an impasse rate of about 25 percent in the absence of such debiasing.[18] Whether providing information will actually increase settlement, therefore, should depend on whether the information provided is processed in a self-serving fashion.

As just discussed (in subsection A), whether the introduction of common information to disputants will increase settlement should depend in turn on whether that information has a single obvious, or multiple possible, interpretations. The research discussed above leads to the clear prediction that expectations will converge when there is only one obvious interpretation of the information. On the other hand, when the shared information is subject to alternative interpretations, disputants will tend to focus on interpretations that favor their own cause, which will cause expectations to diverge and settlement delays to increase. This is the major prediction we test in the study. Our primary hypothesis is that:

H1: Provision of information will produce a convergence of expectations and promote settlement when the information is framed in a fashion that is conducive to only one interpretations, but will lead to divergence of expectations and impede settlement when it is framed in a fashion that allows for multiple interpretations.

Our secondary prediction arises from the research, discussed above (in subsection B), on the effect of uncertainty on the relationship between the size of the bargaining zone and settlement. Based on this prior research, we predict that larger bargaining zones will increase

[18] See note 17 *supra*.

settlement delays under conditions of certainty because they will increase the potential benefits of aggressive bargaining strategies. However, this relationship should not hold, or hold to a lesser degree, when there is uncertainty about the size of the bargaining zone, in which case there is a countervailing effect – that increasing the size of the contract zone may produce a possibility for settlement when none existed previously. This reasoning leads to our second, subsidiary hypothesis:

H2: When shared information provides certainty about the contract zone, there will be a negative relationship between the size of the bargaining zone and settlement. This relationship will be weaker, or possibly positive, when private information leaves uncertainty about the size of the contract zone.

These two hypotheses are tested in our study.

II. THE EXPERIMENT

Participants. Participants were 112 individuals recruited from Carnegie Mellon University and the University of Pittsburgh with the offer of a $1.50 show-up payment and the prospect of earning money by participating. The average participant was 22 years old (age range 19-49). Fifty-one percent of participants were male.

Experimental design. Pairs of individuals bargained over the sale of a "widget." If they reached an agreement, then each individual received an "agreement bonus." The framing manipulation varied whether the two players' bonuses were symmetric or asymmetric (and if asymmetric, whether the buyer or seller received the larger bonus). In addition, the information

manipulation varied whether each party was informed of the other's bonus size, and therefore knew the size of the contract zone.

To understand the basic design of the study, imagine that the owner of a good values it at $2 and faces a potential buyer who values it at $6. A $4 bargaining zone exists between $2 and $6. Now imagine, instead, that the good is worth $3 to the seller and $5 to the buyer but that each will receive an additional $1 benefit from settling early. It is beneficial for the seller to sell at any price above $2 and for the buyer to buy at any price below $6; the settlement zone is unchanged. This shows that the same bargaining zone – between $2 and $6 – can be framed in these two different ways.

As an alternative scenario, imagine that the good is worth $5 to the seller and $5.50 to the buyer, and that the seller will receive a $3 settlement benefit and the buyer a .50¢ settlement benefit. Again, the bargaining zone is unchanged – between $2 and $6 – but there is now an asymmetry between the two parties that increases the scope for differential (and self-serving) assessments of fairness. The buyer will be motivated to view the difference in settlement bonuses as important, while the seller will be motivated to focus only on the nominal value of the object to each party. Note that in the above example, the settlement benefits in the latter two conditions are actually only a matter of "framing," since the objective incentives facing the two parties are held constant. This is the strategy we employ in the experiment reported below.

Finally, imagine two situations, one in which the settlement benefits are common knowledge, and another in which each party only knows his or her own settlement benefit. When settlement benefits are identical, then sharing information about them should, if anything, lead to a convergence of expectations because there is little scope for self-serving interpretations of their significance. However, when settlement benefits are asymmetric sharing information

about bonuses is more likely to result in different inferences about fairness, produce divergent expectations, and impede settlement.

The design of the experiment is summarized in Table 1. The settlement bonus varied across conditions. In half of the conditions it was $.50 for both parties, and in the other half it was asymmetric—$.50 for one side and $3.00 for the other. The nominal value of the widget to each side was manipulated with settlement bonuses to keep the real size of the bargaining zone constant. The bargaining zone was one of seven sizes, drawn randomly from a uniform distribution between $3.50 to $8. Each randomly selected bargaining zone was balanced across all symmetry and knowledge conditions. The midpoint of the real bargaining zone was always $6.48 across all conditions. Table 1 illustrates this scheme, including the nominal values and real reservation prices with an example of an $8 bargaining zone.

The information that each party had about the other side was also manipulated. In the full information condition, buyers and sellers were each given complete information about one-another: show-up fees, nominal values, and agreement bonuses. In the unknown bonus condition, they knew everything about one another except the other side's bonus. They were told, truthfully, however, that there was a 50% chance that the other side's bonus was $.50 and a 50% chance that it was $3.00.

Procedure. In each experimental session, two to four pairs of negotiators were constituted by randomly pairing participants seated at isolated computer terminals. All 56 negotiations took place via computer-mediated chat. Negotiators never learned the identities of their negotiating opponents. At the conclusion of each experimental session, participants were paid in cash for the outcomes of their negotiations as well as the show-up fee. The experiment took approximately 15 minutes.

The experimental materials for one condition are reported in the Appendix. Subjects were first informed of their roles, then told about their own nominal values and those of their counterparts. For example, the stimuli for a typical buyer read:

> You will be a buyer, negotiating over the purchase of one widget. You will be paid today based on your ability to obtain a low price for your widget. Since widgets are worth $8.65 to you, prices below $8.65 are profitable. You lose money on the purchase at prices above $8.65. It costs the seller from whom you buy widgets $4.31 to produce them, so prices above $4.31 are profitable for the seller. The seller loses money on the sale at prices below $4.31.

Subjects were told that they would have 5 minutes to negotiate and that, if they ended with no agreement, neither would receive payment. They were then told about their own and the other side's bonus. The stimuli for the buyer in the condition with uncertainty about the other party's bonus read:

> Once you start negotiating, you have 5 minutes to talk. If you cannot come to agreement within 5 minutes, then you will be left with an impasse (no agreement), and neither of you will receive any money for your negotiation. If you come to an agreement with the seller, you will receive an agreement bonus of $.50 in addition to being paid for your negotiated outcome. The seller with whom you are negotiating also receives an agreement bonus, but it may be different from yours. There is a 50% chance that the seller's agreement bonus is $.50 and a 50% chance that the seller's agreement bonus is $3.00.

Subjects were then informed about the incentives they faced for reaching a settlement. They were told that for every second they spent negotiating, they and their negotiating partner would each pay one half of a cent, which would be either deducted from their earnings (if they

settled) or from their show-up payment (if they did not). Thus, if they negotiated for the whole 5 minutes without reaching settlement, they would each pay $1.50, which would eliminate their show-up payments.

After reading the instructions, subjects were presented with a series of question to ensure that they understood the instructions. They were asked to report each side's redemption values, the penalties for non-settlement, and each side's settlement bonus. They were then given instructions on communicating and negotiating with their partner that specified they should not transmit any identifying information. Before they began bargaining, subjects were asked "What would a fair price be, according to a neutral third party?" After specifying a fair price, subjects were asked to indicate how confident they were in their assessment of fairness, on a scale from 0% to 100%. Finally, subjects negotiated, were debriefed, paid, thanked, and dismissed.

III. RESULTS

Figure 1 shows average negotiation lengths for the four main conditions. The pattern revealed by the figure provides strong support for our central prediction stated in our first hypothesis: an interaction between the provision of information and its symmetry. This interaction is statistically significant in a 2 X 2 analysis of variance (ANOVA) on negotiation length using bargaining zone size as a random factor, $F(1,6) = 14.03$, $p < .01$. When the two negotiators had identical "agreement bonuses," agreements were reached more quickly when both parties knew one another's bonuses (M = 1:12) than when they did not (M = 1:51), although this difference is not statistically significant according to a contrast test, t (52) = 1.33, ns. On the other hand, when the two negotiators had different agreement bonuses, negotiations took significantly longer when information about bonuses was shared (M = 2:38) than when it was not (M = 1:37), t (52) = 2.05, $p < .05$. The effect of the two manipulations was tested by regressing

negotiation length on dummy variables representing whether the negotiators had asymmetric agreement bonuses ('asymmetric'), whether they knew the value of one-another's bonuses ('knowledge'), and the interaction between these variables (see first column of Table 2). Reinforcing the results just reported, the interaction effect is positive and statistically significant. The same pattern can be seen in Table 3, which presents impasse rates by condition. Although impasse rates are generally low, one cell of the table stands out. Fully 29% (4 out of 14 pairs) in the asymmetric full knowledge condition failed to settle at all; only one pair failed to settle in all the other conditions combined.

Model 2 in Table 2 adds terms to the regression reported in Model 1 to test for a differential effect of bargaining zone size under conditions of certainty and uncertainty as predicted by our second hypothesis. Both coefficients are significant in the predicted direction. Time to settlement is significantly negatively related to the size of the bargaining zone. The interaction between bargaining zone size and knowledge is also significant, indicating that the relationship is smaller in absolute terms, or possibly reversed, under conditions of uncertainty. The same pattern can be seen by comparing the correlation between settlement times and bargaining zone size in the known bonus condition ($\underline{r} = .17$, $\underline{p} = .38$) and the unknown bonus condition ($\underline{r} = -.52$, $\underline{p} < .005$).

Finally, we examine subjects' pre-bargaining reports of what they consider to be a fair settlement point to test our proposed explanation for the interaction effect between asymmetry and joint knowledge of settlement bonuses. The variable DIFFAIR represents the pre-negotiation difference between the seller's and buyer's perceptions of a fair price. We used a trimmed version of the variable that recoded values greater than .75 to .75 and recoded values smaller than -.75 to -.75. This affected 9 of 56 pairs—outliers that otherwise would have had a

disproportionate impact on the analysis. Table 4 presents mean levels of DIFFAIR by condition. As Table 4 shows, DIFFAIR is tiny and not significantly different from zero in three of the four conditions. It is positive and significantly different from zero in the one condition in which we expect to observe self-serving assessments of fairness—namely where there is common knowledge and asymmetric settlement bonuses. The third and last model in Table 2 adds DIFFAIR to the regression. As predicted, the sign of DIFFAIR is positive and significant—the greater the discrepancy between the seller's and buyer's perception of the fair price, the longer it takes the parties to settle. In addition, inclusion of the DIFFAIR term lowers the magnitude of the interaction term between asymmetry and knowledge, a pattern that suggests that the negative effect of sharing information under conditions of asymmetry is mediated by its effect on the self-serving bias.

IV. Discussion

The results reported here provide support for both of our central predictions. First and most important, the provision of additional information served to either increase or decrease the efficiency of settlement depending on the framing of the contract zone. When additional information revealed that both sides had the same settlement bonuses, time to settlement decreased. That information is likely to have been interpreted similarly by the two sides, harmonizing expectations for settlement and facilitating agreement. Provision of additional information about settlement bonuses impeded settlement, however, when the two sides had different settlement bonuses. More information slowed agreement when there were multiple possible interpretations of the information, which was true when the bonuses were asymmetric. This pattern held true, holding objective contract zones constant.

Second, the effect of the size of the contract zone, which was manipulated orthogonally to the other variables, depended on the presence or absence of uncertainty. When there was certainty about contract zones, increasing the size of the contract zone increased settlement times and decreased efficiency. On the other hand, when there was uncertainty because parties were not aware of their counterpart's settlement bonuses, increasing the size of the contract zone if anything decreased settlement times and increased efficiency. This result replicates findings from earlier theoretical and empirical research on bargaining.

A question worth asking is whether our experimental setup bears similarity to any legal setting outside the experimental laboratory. The presence of settlement bonuses that are known or unknown bears resemblance to the presence of attorneys' fees which may be known or unknown to the principal disputants. Disputants enjoy a settlement benefit if they are able to agree rather than go to trial and incur the attorneys' fees that result. Imagine that both sides were required to reveal their fee arrangements and litigation expenditures. It is likely that the party with contingent fees will believe that the other party should be willing to accept a lower settlement rather than pay the high hourly fees associated with trial. The party with the expensive attorneys paid hourly, on the other hand, would be likely to argue that the attorneys' fees are immaterial to the terms of settlement. Our results suggest that the impediments to settlement created by the revelation of this information will increase with the size of the bargaining zone and the potential negotiated surplus.

A. Information Exchange and Bargaining Efficiency

During the pre-trial discovery phase of a civil suit, attorneys share a great deal of information about the case. It is generally assumed that open exchange of information will help align the expectations of disputants and increase efficiency by facilitating settlement. The

evidence presented here suggests that this relationship does not always hold. Information that is complex or ambiguous enough to allow for different interpretations by the two sides will increase opportunities for self-serving interpretations of that information. Self-serving interpretations of fairness encourage biased estimations of the probability of prevailing in court and lead people to hold out too long, fight too hard, and settle too slowly.[19]

In actual cases, the magnitude of this problem depends fundamentally on the degree to which the information exchanged during discovery will be interpreted by disputants in a self-serving fashion. On the one hand, our controlled laboratory experiment may have overstated the importance of this phenomenon by manipulating framing and controlling other influences on outcomes. On the other hand, evidence suggests that the richer, the more complex, and the more contextual the information, the greater its ambiguity and the greater the potential for differing interpretations of its meaning.[20] Thompson and Loewenstein[21] found their participants tended to arrive at self-serving interpretations of fairness and that this bias was exacerbated by additional information, which increased the realism of the case but which had been rated as neutral by nonpartisan observers. By contrast, the information provided to our participants was simple, clear, and open to less ambiguity. If the simple framing manipulation in our study was enough to prompt significant divergence in perceptions of fairness, it is likely that information shared in actual civil court cases allows far greater opportunities for divergent interpretation.

It is possible that experienced professionals may be less susceptible to bias than the non-lawyer participants in the present experiment.[22] However, prior studies have documented self-

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[19] Margaret A. Neale and Max H. Bazerman, *The Role of Perspective-Taking Ability in Negotiating under Different Forms of Arbitration*, 36 Ind. Labor Relat. Rev. 378 (1983).
[20] Ziva Kunda, *The Case for Motivated Reasoning*, 108 Psychol. Bul. 480 (1990).
[21] See note 9 *supra*.
[22] Russel Korobkin and Chris Guthrie, *Psychology, Economics, and Settlement: A New Look at the Role of the Lawyer*, 76 Texas Law Review 77 (1997).

serving bias among attorneys[23] and professional negotiators,[24] suggesting that it is unlikely that our participants were unique in their vulnerability to bias. Even if individuals are subject to bias, important cases are pursued not by an individual but by a team of attorneys, and one might hope that groups would be more reasonable and less extreme in their judgments. But evidence suggests otherwise; indeed, evidence on group polarization and the "severity shift" suggests that groups may come to more extreme judgments than individuals.[25] Nevertheless, there is some reason for optimism in the fact that the disputants who fall victim to the bias are also the ones who pay its costs most directly: Therefore, those who are in the best position to do something about it also have an incentive to do so. The truth is that the vast majority of cases settle before trial, and settlement rates are increasing as a percentage of all cases in the United States.[26] Nevertheless, litigation remains widespread, and substantial additional efficiencies could be realized if settlement were further facilitated by reducing the types of information processing biases demonstrated in the present experiment.

B. Concluding Comments

This research is intended to build on important work that has been done analyzing the strategic dynamics of discovery and pretrial bargaining. Shavell, for example, builds a model of information-sharing in legal disputes and concludes that discovery decreases the probability of

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[23] Elizabeth F. Loftus and Willem A. Wagenaar, *Lawyers' Predictions of Success*, 28 Jurimetrics 437 (1988); Theodore Eisenberg, *Differing Perceptions of Attorney Fees in Bankruptcy Cases*, 72 Washington University Law Quarterly 979 (1994); Richard Birke and Craig R. Fox, *Psychological Principles in Negotiating Civil Settlements*, 4 Harvard Negotiation Law Review 2 (1999).

[24] Carsten K. W. De Dreu, Aucke Nauta, and Evert van de Vliert, *Self-Serving Evaluations of Conflict Behavior and Escalation of the Dispute*, 25 J. Appl. Soc. Psychol. 2049 (1995); Linda Babcock, Xianghong Wang, and George Loewenstein, *Choosing the Wrong Pond: Social Comparisons in Negotiations That Reflect a Self-Serving Bias*, 111 Q. J. Econ. 1 (1996).

[25] David A. Schkade, Cass R. Sunstein, and Daniel Kahneman, *Deliberating About Dollars: The Severity Shift*, 100 Columbia Law Review 1139 (2000).
Cass R. Sunstein, *Deliberative Trouble? Why Groups Go to Extremes*, 110 Yale Law Journal 71 (2000).

[26] Charles Silver, *Does Civil Justice Cost Too Much?*, 80 Texas Law Review 2073 (2002).

settlement negotiations proceeding unresolved before trial.[27] Yet Shavell's model is built on the assumption that parties' views will be harmonized, not polarized, by the sharing of credible information. Other models of pretrial bargaining and legal discovery have similarly tended to assume that information exchange will facilitate agreement because it will harmonize the two sides' expectations.[28] The evidence presented here suggests that the applicability of these models may be limited to domains in which the disputing parties interpret information similarly, either because it is so simple and straightforward as to be unambiguous, or because it affects both sides symmetrically.

It is likely that most of the information acquired and shared during pretrial discovery is rich, complex, and ambiguous enough that opposing parties may interpret it differently. Although it may be tempting to hope that the higher incentives present in actual legal disputes might facilitate settlement by increasing the benefits of resolution, our study suggests that increasing the stakes will increase the chance that full information sharing will impede settlement. It may appear that neither side has the incentive to unilaterally disarm by reducing the self-serving nature of its approach. Indeed, ambitious and demanding negotiation tactics are effective tools for obtaining one's desired outcomes. However, advising negotiators to be ambitious is different from advising them to be biased. Optimal strategy would be to acquire and assimilate information in an unbiased fashion so has to have the best information possible, while at the same time selecting the negotiation strategy that is appropriately ambitious.

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[27] Steven Shavell, *Sharing of Information Prior to Settlement or Litigation*, 20 Rand J. Econ. 183 (1989).
[28] Kathryn E. Spier, *The Dynamics of Pretrial Bargaining*, 59 Rev. Econ. Stud. 93 (1992).
Robert D. Cooter and Daniel L. Rubinfeld, *An Economic Model of Legal Discovery*, 23 J. Legal Stud. 435 (1994).
Paul Fenn and Neil Rickman, *Delay and Settlement in Litigation*, 109 Econ. J. 476 (1999).
Bruce L. Hay, *Effort, Information, Settlement, Trial*, 24 J. Legal Stud. 29 (1995).

Appendix 1: Example experimental materials for a buyer in the asymmetric bonus, full information condition with a $5.26 bargaining zone

Thanks for participating in this study! You will receive a $1.50 show-up payment in addition to whatever you come away with from your negotiations. You will be negotiating via computer-mediated "chat" with a partner who will remain anonymous.

You will be a buyer, negotiating over the purchase of one widget. You will be paid today based on your ability to obtain a low price for your widget. Since widgets are worth $6.11 to you, prices below $6.11 are profitable. You lose money on the purchase at prices above $6.11. It costs the seller from whom you buy widgets $4.35 to produce them, so prices above $4.35 are profitable for the seller. The seller loses money on the sale at prices below $4.35.

Once you start negotiating, you have 5 minutes to talk. If you cannot come to agreement within 5 minutes, then you will be left with an impasse (no agreement), and neither of you will receive any money for your negotiation. If you come to an agreement with the seller, you will receive an agreement bonus of $3.00 in addition to being paid for your negotiated outcome. The seller with whom you are negotiating will receive a $.50 agreement bonus.

For every second you spend negotiating, you and your negotiating partner will each pay one half of a cent. So if you negotiate for 2 minutes and 30 seconds (a total of 150 seconds), you will each pay $.75 in time penalties.

The seller with whom you will be negotiating knows the same things about you that you know about them. They know that prices below $6.11 are profitable for you. They know that you receive a $3.00 bonus if you come to an agreement. And they know that you will pay $.01 for every 2 seconds you spend negotiating. They do not know anything else about you.

If you cannot come to agreement and are left with an impasse, you will receive your $1.50 show-up fee, but it will be reduced by whatever time penalties you incur for the time you spend negotiating.

When you have read and understand these instructions, please continue to the next page.

HOW TO COMMUNICATE WITH YOUR NEGOTIATION PARTNER

Please observe the following rules while negotiating:

- Do not reveal your real name or anything that might allow your counterpart to identify you. This is important both for your own privacy, and for the purity of the experiment.
- Other than that, feel free to tell the person with whom you are negotiating anything you wish, including your bottom line price. They may also tell you anything they wish. Remember that they may or may not be telling you the truth.

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PRE-NEGOTIATION PLANNING

1-1) What would a fair price be, according to a neutral third party? Please answer this question even if you are not sure about your answer.

_____

1-2) How confident are you about your answer above?
Please mark an X on the line below to indicate your level of confidence.

0% 100%
|----------|

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POST-NEGOTIATION OUTCOME

1-3) How long did the negotiation last?

_____ minutes _____ seconds

Table 1

Experimentally manipulated agreement bonuses for buyer and seller, with an example of nominal values and real reservation prices for an $8 bargaining zone.*

			Asymmetric bonus condition		Symmetric bonus condition	
Role	True reservation prices	Big bonus to	Bonus	Nominal reservation prices	Bonus	Nominal reservation prices
Buyer	$10.48	Buyer	$3.00	$7.48	$.50	$9.98
Seller	$2.48		$.50	$2.98	$.50	$2.98
Buyer	$10.48	Seller	$.50	$9.98	$.50	$9.98
Seller	$2.48		$3.00	$5.48	$.50	$2.98

* Actual bargaining zone sizes were: 6.72, 5.63, 5.34, 5.17, 4.79, 4.75 and 4.22.

Table 2

Regression analysis of negotiation length in minutes.

	Model		
	1	2	3
(Constant)	1.85***	6.37***	6.37***
	(.35)	(1.68)	(1.60)
asymmetric	-.23	-.23	-.26
	(.50)	(.47)	(.45)
knowledge	-.66	-6.93**	-6.83**
	(.50)	(2.37)	(2.25)
asymmetric*knowledge	1.67**	1.67**	1.37**
	(.70)	(.66)	(.64)
bargaining zone		-.86**	-.87**
		(.314)	(.30)
knowledge* bargaining		1.12**	1.17**
zone		(.44)	(.42)
fairness difference			.88**
			(.44)
n of observations	55	55	53
R^2	.10	.27	.33

Notes: Standard errors in parentheses; * p<.10; ** p<.05; *** p<.01

Table 3

Impasse rates as a function of symmetry and knowledge.

Other party's reservation price	Settlement bonus	
	Symmetric	Asymmetric
known	7.1% (1 of 14)	29% (4 of 14)
unknown	0% (0 of 14)	0% (0 of 14)

Table 4

Mean differences in perceptions of fairness.

Other party's reservation price	Settlement bonus	
	Symmetric	Asymmetric
Known	.06	.23
	(.37)	(.46)
Unknown	.08	.05
	(.42)	(.23)

Note: standard deviations in parentheses.

Figure 1. Mean negotiation lengths in the four experimental conditions.